**HARSH PATEL**

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**SKILLS SUMMARY**

* Experience in all aspect of engineering testing system such as Test plans, Testing strategizing, Test evaluation, Test report, Report to Management, Project Management, Risk Management, Quality Management and Validation. .
* Experience in development, execution and verification of protocol stack feature tests, integrated stack tests, functional tests, regression test, mobile management function test and operator specific interoperability test.
* Good understanding of IMS, VOLTE, SIP protocols. Engineer experienced in protocol testing, log analysis.
* Knowledge on phase of Software Testing Life Cycle and phase of software Quality Assurance.
* Knowledge on access technology like GSM, GPRS, TDMA and CDMA network and device function.
* Basic understanding on different technology such as 2G,3G, LTE, VOLTE and 5G NR.
* Experience in carrying out engineering test plans like Carrier conformance (AT&T & VzW) & Acceptance testing on R&S CMW500 & Keysight and updating test case repository with status on a daily basis.
* Experience with R & S Project explorer, context keysight- SAS Sequencer
* Experience in Microsoft Office Suit (Excel, Power Point, and Word) and statistical analysis software like, Minitab.
* Experience of using tool of Shannon DM, QCAT, QXDM.
* Experience on 5G certification testing.
* Understanding of Telecommunications OSP Engineering Design and related systems with using knowledge of computer aided design, AutoCAD, Micro Station, MS Office Suite (Word, Excel, Power Point) and database proficiency.

**EDUCATION**

**Mechanical Engineering, MS**

Gannon University, Erie PA, USA

**WORK EXPERIENCE**

**Lab Test Engineer** Sep 2019 – Present Samsung Electronics. San Diego, CA

* Debug issues and check call flows (signaling messages) for GSM, UMTS and LTE, 5G NR.
* Generate CP, AP and TCP logs for failed test cases and file bugs.
* Working on LTE IOT of Samsung devices for different operators like AT&T, T-Mobile, Verizon.
* Working on VoLTE test plans to execute IOT tests on new Samsung VoLTE devices on AT&T, T-Mobile and Verizon carrier.
* Executing conformance tests on wireless devices and technologies for major worldwide chip/handset manufacturers using proprietary InterLab system.
* Participating for Validate new test plans.
* Able to use test and measure equipment such as network and spectrum analyzers and power meters.
* Developing functional testing plans and performing end-to-end phases of test execution.
* Refining full functional test plans and developing Quality Assurance test plans.
* Supported senior functional tester in developing formal acceptance functional test procedures to meet customer requirements.
* Communicated test results and performed tracking of non-testable software.
* Conducted regression, performance, functional, manual, front-end, back-end, black-box, Bluetooth, WiFi system integration testing of software changes.
* Participating in detailed analyses of customer device failures and assisting in determining root causes of technical issues.
* Strong knowledge of ADB commands.
* Experience with LTE protocol issues from the carriers, and debug cellular issues reported from certification tests and field tests by doing in-depth log analysis using Qualcomm tools.
* Performed Daily regression, Legacy and KPI stress testing with using Bluetooth technology automation Field master tool 0.92.
* Experience using C, C++and Python for Automation like, SFAT, Field master tool 0.91 and Fast server automation test case using python script.
* Able to identify issues on physical layer, MAC, and RRC layers of modem software, troubleshooting and debugging utilizing Qualcomm tools APEX/QXDM and test stations including R&S (CMW 500), Anritsu 8475, CMW 500and Keysight.
* Performed AT&T 10776 Testing Plan, such as LTE Mobility management Procedures, Network selection, LTE Inter & Intra-RAT mobility, CSFB, LTE ENS, VOLTE/IMS & Handover from Different RAT to WIFI calling.
* Good knowledge on LTE protocol stack- L1, L2, L3 layers.
* Knowledge on 5G/LTE Frames, HARQ, RLC modes, RLF, DCI, Carrier aggregation, handovers, cell selection, cell reselection, IMS Architecture, VoLTE call flows, S1 & X2 handover and etc.
* Familiar to use various tools for prototype, drafting, measurement and computations: CAD, MATLAB, SHANNONDM (Modem Chip Logging), SPIRENTS UMETRIX (Measurements and Performance).
* knowledge of  UMDF/KMDF Drivers for Modems and USB based modem over MBIM Protocol, NDIS mini port drivers
* Able to identify the user experience KPIs and tests based on the product specification.
* Maintaining of wireless test equipment including inspection, cleaning, calibration, SW and HW updates, license management etc.
* Researching and reviewing wireless electronics technologies in order to maintain up-to-date knowledge regarding industry standards and practices.
* Performed different test category such as throughput, video calling, real time text (RTT),

Wi-Fi calling, Chatbot, wireless emergency alert, Device update, DSDS, Carrier aggregation, EPTT, LAA, GPRS, MCPTT, power saving mode, NR data performance.

* Working with cross functional teams (Development, Test & Standards Team) for the issues that required detailed root cause analysis. Participate inter team training & presentation events for new project test & analysis.
* Reporting Test results & bugs & creating tickets for test failures as needed. Initial log analysis for pin-pointing issues & Assigning failures to the right sub-component for further analysis.
* Expertise with wireless technologies Bluetooth, Multiple input, and output (MIMO), Carrier aggregation, VoLTE, Modulation. Performed test cases on different layers of protocol stack.
* Knowledge of call flow with test box. Performed test cases in lab and live network. Worked on different lab equipment’s like Rohde & Schwarz, Spirent, Antirsu.
* Worked on protocol like NAS, RRC, RLC, MAC, PDCP, SIP, Physical Layer and IMS. Debugged and fix issues found during different testing phases. During this project I helped customer support team to answer customer question on RRC layer.
* Understanding of internet protocol such as TCP, IP, UDP and networking and security standards.
* Experience in 4G and 5G air interface and call processing technologies and network architecture specifically focused on Radio Access Network
* Experienced in 5G core architecture. Performed the test case in Nokia and Ericson market for Samsung 5G devices with QUALCOMM chipset. Performed test on FR1 and FR2 5G frequency bands.
* Knowledge of new 3GPP NR specifications. Support network for issue like 5G attachment, 5G icon, handover, throughput, E911, beam forming, carrier aggregation, NSA and SA.
* Experience in C, C++ Scripting languages to develop automated tests.

**RF Test Engineer** July 2016 – July 2017

Airtel, Gujarat, India

* Experienced in manual testing using user interface and proficient in Black and white Box Testing, Regression Testing, Functional testing, and experience in Bug tracking.
* Analyzed software failures, reported using JIRA.
* Found bugs in functional and protocol testing of various data types including VOLTE, SMS, and MMS.
* Debug issues and check call flows for UMTS, LTE and generate cp and ap logs for failed test cases.
* Performed E100 and CMAS testing in field and lab. Executed different test category such of Wi-Fi Calling, IMS video calling, Call processing, WLAN, Inter RAT, Intra RAT, LTE data performance, 3rd party applications, IPME.
* Automation test development with direct programming experience in API testing.
* Operated Mobile testing on live/ Lab network on 3G.

**COMPUTER PROFICIENCIES**

* Trained in AutoCAD, CREO, Solid Work
* Skilled in MATLAB, MathCAD, SAP.
* Proficient in Microsoft Office applications (MS Word, MS Excel, MS Projects)
* Proficient in Networks protocols DNS, DHCP, UDP, TCP, IP, FTP, HTTP, VOIP
* Protocol Stack: - NAS, RRC, PDCP, RLC, MAC, PHY
* Architectures: - 5G, VOLTE, IMS, Wi-Fi, GPRS, PSTN
* Lab Tools: - Rohde & Schwarz, Anritsu 8475, CMW 500, Keysight
* Log analysis tools: - QXDM, QCAT, Shannon, XCAL, XCAP
* Programing Language**:** C, C++, Python