Product Requirement Document (PRD)

Water Heater Tablet Remote Control

for

Paloma

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Revision History:

Date	Rev No.	Description	By
9-Jan-2017	A0-01	Internal Draft Release	VVDN
20-Jan-2017	A0-02	Customer Review comments are updated; HW Architecture diagrams are updated	VVDN
01-Feb-2017	A0-03	Customer Review comments are updated; HW Architecture diagrams are updated	VVDN

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1   Introduction

This document describes the system level requirements of Water heater Tablet remote control(TAB_REMOTE) and Wireless charger(WL_CHGR) to be designed for Paloma. These requirements have been derived from the requirement specifications provided by the customer and subsequent discussions with the customer.

This PRD is made for the reference of

- Product managers at VVDN/Paloma to confirm the requirements before development
- Engineering Team at VVDN for Architecture, Design and Development of TAB_REMOTE and WL_CHGR
- System Integration and Verification team at VVDN/Paloma

Note:

- Hereafter Water Heater Tablet remote control will be called as TAB_REMOTE and Wireless Charger as WL_CHGR.

1.1   Product Overview

The TAB_REMOTE will allow the user to control the Water Heater using an app. The given control information by the user will be transmitted to the WL_CHGR via BLE. The WL_CHGR will be having the Wireless Power transmitter and the system to con the boiler. The control signals will be transmitted through wires to the Water Heater to increase (or) decrease the temperature. When the tablet will be placed inside the charger, battery in the tablet will be charged wirelessly. The users can playback audio & video using the tablet and browse after connecting tablet to WiFi.
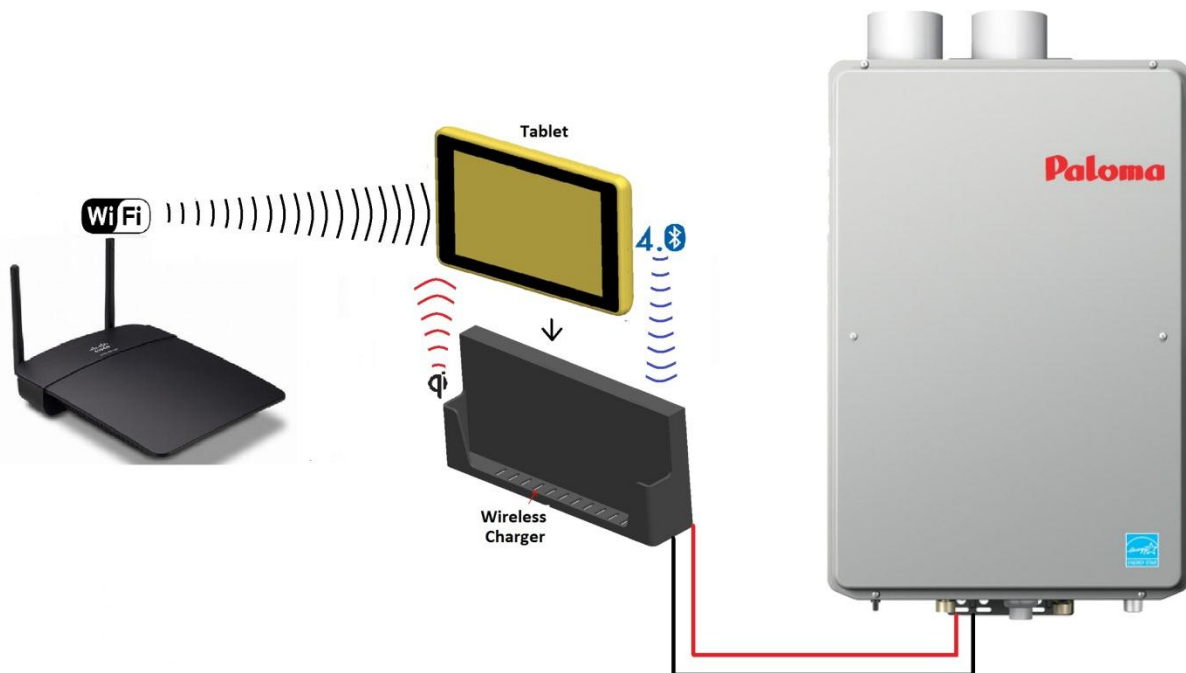
Figure 1: Paloma Tablet Remote - Product Overview

1.2   Scope of the Project

The scope of this project is to design, develop and deliver the hardware, mechanical, firmware and application for Tablet remote and Wireless charger. Below is the scope of the project.

Hardware Design & Development

- Hardware Design Document
- Schematics Drafting
- PCB layout & Gerber generation
- Bring up Testing and Design Validation Testing
- Environmental testing like temperature, moisture
- Delivering tested boards along with test report

Mechanical Design & Development

- Enclosure Design
- Delivering 3D files of enclosure
- Enclosure fabrication
- Boards integration into Enclosure for 10 Units

Software Design & Development

- Software Design Document
- Linux porting & Driver Development
- Wireless charger firmware Development
- Water heater Remote Android App Development
- Remote tablet board bring up
- Wireless charger board bring up
- POC driver development and testing
- Software release along with Test Report and documentation

2 Product Functional Requirements

Below are the various product level requirements of TAB_REMOTE and WL_CHGR.

Table 1: Product Requirements

Functional Requirements - Product			
PR_ID	Requirements in Brief	Requirements in Detail	Proposed Implementation
TAB_REMOTE			
PR-01	CPU	Should have • Multi ARM Core • Multimedia Core • Peripheral interfaces • On-Chip Memory	• Processor with required functionality will be selected
PR-02	Internal Memory	Should have • Min 1GB DDR3 SDRAM • Min 8GB eMMC Flash	• 1GB DDR3 SDRAM will be selected and used • 8GB eMMC flash will be selected and used
PR-03	Operating System	Should be • Android vers6.0	• System will be designed to support in Android vers6.0
PR-04	Display	• 7" TFT LED Display • 1024x600 pixels	• 7" TFT LED display with 1024x600 pixels will be selected and used
PR-05	Touch type	Should be • Capacitive	• Display with Capacitive touch will be selected and used
PR-06	Sensor	• Gyro Sensor	• 3-Axis sensor will be selected and used.
PR-07	Water heater control Android App	• Bathroom Remote control App	• Android Application to control the bathroom water heater will be developed.
PR-08	Audio playback support	Should support the audio formats • AAC+, eAAC, AMR-NB, AMR-WB, FLAC, MP3, WMA • Mono Audio output	• System will be designed to support the required audio formats • One 1watt speaker will be added in the system • Required Audio Codec will be used.

PR-09	Video playback support	Should support the video formats • H.264, H.265, MPEG-4, VP8	• System will be designed to support the required video formats
PR-10	Photo viewer support	Should support the image formats • JPEG, GIF, PNG, BMP	• System will be designed to support the required image formats
PR-11	Wireless charger communication interface	• BLE to transmit and receive water heater control/status information	• BLE section will be added in the tablet to communicate with Wireless charger
PR-12	Internet Browsing support	• Browsing via WiFi • Internet Browser Applications (eg. Google chrome, Mozilla firefox)	• Wifi section will be added in the tablet for browsing
PR-13	Audio calling	Should support • Audio calling from Tablet via WiFi network (eg. Skype calling)	• System will be designed with Audio calling support via WiFi. • Required MIC, Speaker and Audio Codec will be used.
PR-14	Battery run time	Should be • 400mins while browsing	• Battery will be selected to run for 400minutes while browsing
PR-15	Battery charging time	• Should be Max 6 hours	• Battery charging section will be designed to charge the battery within 6 hours
PR-16	Battery Charging method	• Should receive power wirelessly while charging	• Qi Wireless power receiver circuitry with required efficiency will be added in the tablet
PR-17	Volume buttons	• To increase and decrease the volume of the audio output	• Two Volume buttons for increasing and decreasing volume will be added
PR-18	Power Button	The power button should allow the user to do the below actions • To turn on/off tablet • To put the tablet in sleep mode • To reboot the tablet	• One power button will be added with the required functionalities
PR-19	Certification	• RF (WiFi& BT) • VCCI EMC certification • PSE Certification	• System will be designed to satisfy the required certifications

PR-20	Dimension	• 195x128x10mm	• System will be designed with mentioned dimension
PR-21	Operating temp	• 0degC to 50degC/humidity of 80%(or)less(with No condensation)	• System will be designed to operate in the mentioned environment conditions
PR-22	Storage Temp	• -20degC to 60 degC (with No condensation)	• System will be designed to store in the mentioned environment conditions
PR-23	Water Proof	• IPx7	• Mechanical Enclosure will be designed to satisfy IPx7
Wireless Charger			
PR-24	CPU	• Min single core • Internal memory • Peripheral interfaces	• Processor/Controller will be selected with the required functionalities.
PR-25	Wireless Power transmitter	• Qi Wireless power transmitter	• Wireless power transmitter circuitry will be designed with the required efficiency
PR-26	Tablet communication interface	• BLE to transmit and receive water heater control/status information received from Water heater	• System will be designed to support BLE as communication interface with wireless charger
PR-27	Water heater communication interface	• 2 wire differential interface • half duplex communication to transmit and receive water heater control/status information received from Tablet	• Required circuitry and communication protocol will be used to communicate with water heater
PR-28	Power Input	• 12V & 18V DC power input	• Circuit will be designed to get the required power for the system from input.
PR-29	Button	• To on/off the water heater, when battery is down in Tablet	• One water heater button will be added
PR-30	Status Indicator	• Wireless power transmitter status • Board power Status • System Status	• Four LEDs will be added to show the wireless power transmitter status
PR-31	Operating temp	• 0degC to 50degC/humidity of 80%(or)less(with No condensation)	• Product will be designed to operate in the required temperature range

PR-32	Storage temperature	• -20degC to 60degC(with No condensation)	• Product will be designed to store in the required temperature range
PR-33	Water Proof	• IPx7	• Mechanical Enclosure will be designed to satisfy IPx7
PR-34	Dimension	• 201x133x32mm	• System will be designed with mentioned dimension

3   Hardware Requirements

3.1   Hardware Functional Requirements

Below are the various electrical hardware requirements of Tablet.

Table 2: Electrical Requirements

Functional Requirements – Hardware – Electrical			
PR_ID	**Requirements in Brief**	**Requirements in Detail**	**Proposed Implementation**
TAB_REMOTE			
PER-01	Processor	Should have • Multi ARM core • Multimedia Core • Internal Memory • Required peripheral interfaces • Audio Codec • Video Codec	APQ8009 from Qualcomm will be used as main processor. It's features • Quad Core ARM7 • Adreno 304 graphics • Audio Codec • Video Codec • I2C, LPDDR3, MIPI, UART, SPI, SDC with eMMC support
PER-02-01	Memory	• Should have 1GB RAM for processor code execution	SD9DS28K-8G from Sandisk will be used in the design. It is a LPDDR3 SDRAM and eMMC flash combo. RAM contains • 32-bit LPDDR3 SDRAM • Supports upto 800MHz • Supply: 1.7-1.9V eMMC flash contains
PER-02-02		• Should have 8GB eMMC flash to store the firmware	• 8GB eMMC flash • Supports eMMC vers5.0 HS400 • Supply: 1.7-1.95V (or) 2.7-3.6V
PER-03	WiFi	• 2.4GHz WiFi transceiver for browsing	WCN3610 from Qualcomm will be used as transceiver for Bluetooth and WLAN RF signals. It supports

PER-04	BLE	• BLE transceiver for communicating with wireless charger	• IEEE802.11b/g/n standard • WLAN 2.4GHz transceiver • Supports Bluetooth 4.0 • Integrated PA and LNA
PER-05	TFT Display	Should have • 7inch Size • 1024x600 pixels • MIPI • Capacitive Touch • Backlight	LTK070C30A81T from Leadtek tech will be used in the system. It supports. • 7inch Size • 1024x600 pixels • MIPI • Capacitive Touch • Backlight
PER-06	Power Management	Should give • Required power rails for on-board loads	PM8916-1 from Qualcomm includes Power management section, clock section and Audio Codec section. The Power management section will be used to give the required power for Processor, Memory, WiFi-BT transceiver, ALS. TPS65100 from TI will be used to supply the power required for the TFT Display.
PER-07	Clock Oscillators	Should give • Required clocks for the On-board devices	The Clock section in PM8916-1 from Qualcomm will be used to give the required reference clocks in the System.
PER-08-01	Audio Interface	Audio Codec should have • 1 MIC Input • 1watt speaker driver • Digital Audio interface	The Audio CoDEC in PM8916-1 from Qualcomm contains the below features. • Three MIC inputs • Class D speaker driver output • PDM interface
PER-08-02		Playback Speaker should support • Impedance of 4ohm (or) 8ohm • Power rating of 1watt	4ohm (or) 8ohm speaker with 1watt rating will be selected and used.
PER-08-03		Voice calling MIC should have • Analog MIC • Frequency response 200Hz to 10KHz	Analog MIC with frequency response from 200Hz to 10KHz will be selected and used.
PER-09-01	Battery Management	Battery Charger Should support • 4V to 6.2V Input, 1.5Amp	SMB1360 from Qualcomm will be used in design. It includes • Battery Charger with 4.2 to 6V input and 1.5Amp • Coin Cell charger

PER-09-02		Fuel Gauge Should have • Current Sensing Unit • Voltage Sensing Unit • Temperature sensing unit • Peripheral interface	• Fuel gauge with Current, Voltage and temperature sensing units with I2C
PER-09-03		Rechargeable Battery Should support • PSE complaint • Capacity: TBD • Voltage: TBD	Suitable component will be selected and used during the detailed design phase
PER-09-04		Rechargeable RTC coin cell should support • Capacity: TBD • Voltage 3V	Suitable component will be selected and used during the detailed design phase
PER-10-01	Wireless Power Receiver	Wireless Power Receiver should support • Qi Complaint • Power transfer rating:TBD	Suitable component will be selected and used during the detailed design phase
PER-10-02		Wireless Power Receiving Antenna should support • Qi Complaint • Power transfer rating:TBD	Suitable component will be selected and used during the detailed design phase
PER-11	Gyro Sensor	Should have • 3-Axis Gyro sensor	L3GD20H from ST Microelectronics will be selected and used. It supports • 3-Axis sensing • I2C/SPI Interface
PER-12	Ambient Light Sensor	Should have • Ambient Light Sensing Photo diode • Peripheral interface	NOA3302 from ON Semi will be used as Ambient light sensor. It supports • Measuring range 0.05 to 52000lux • I2C interface
PER-13	Display Interface Connector	• Display Interface Connector should be 0.5mm pitch 30-pin connector	Suitable component will be selected and used during the detailed design phase
PER-14	Touchpad Interface Connector	• Touchpad Interface Connector should be 0.5mm pitch 8-pin connector	Suitable component will be selected and used during the detailed design phase

PER-15-01	Volume Buttons Power Button	• Two momentary push buttons for volume control	Suitable components will be selected and used during the detailed design phase
PER-15-02		• One momentary push button for power on/off, reboot, sleep mode activation	Suitable components will be selected and used during the detailed design phase
PER-16	Operating temperature	• 0degC to 50degC/humidity of 80%(or)less(with No condensation)	Suitable components will be selected to satisfy the temperature range
PER-17	Storage temperature	• -20degC to 60degC(with No condensation)	Suitable components will be selected to satisfy the temperature range
WL_CHGR			
PER-18	CPU	• Min single core • Internal memory • Peripheral interfaces	nRF52832 will be used in the design. It supports the below features • 32-bit ARM-M4 Core with 64MHz • 512kB Flash • 64kB RAM • SPI, UART, I2C • BLE Transceiver
PER-19-01	Tablet communication interface	• BLE Transceiver	
PER-19-02		• Should have band pass filter (2.400 to 2.4835 GHz) • Should have PA & LNA to strengthen the bluetooth RF signal.	BPF, LNA and PA will be selected and used in the design
PER-19-03		• Bluetooth Antenna to receive the signal from 2.400 to 2.4835 GHz.	Suitable Bluetooth antenna will be selected and used.
PER-20-01	Water heater communication interface	• One 2-pin connector to connect to Water heater.	One two pin connector will be selected and used.
PER-20-02		• Analog circuit to filter data signals and 12V & 18V power.	Required filter circuit will be designed and used.

PER-21	Wireless Power transmitter	Should have • Qi Complaint • Power Out: TBD	Suitable component will be selected and used during the detailed design phase.
PER-22	Power input Connector	• 12V & 18V DC power input connector	To be selected during the detailed design phase.
PER-23	Switch	• To on/off voice calling	Suitable component will be selected and used during the detailed design phase
PER-24-01	Status Indicators	• One Red LED and One Green LED to indicate Wireless power transmitter status	Two LEDs will be added in the design
PER-24-02		• Green LED to indicate Board Power Status	One LED will be added in the design
PER-24-03		• Blinking Green LED to indicate System Status	One LED will be added in the design
PER-25	Operating temp	• 0degC to 50degC/humidity of 80%(or) less(with No condensation)	Suitable components will be selected to satisfy the temperature range
PER-26	Storage temperature	• -20degC to 60degC(with No condensation)	Suitable components will be selected to satisfy the temperature range

3.2   External Interface Requirements

This section describes external interface components requirements of WL_CHGR. The exact component would be finalized based on mechanical review and suggestion from customer.

Table 3: External Interface Requirements

Interface	Details	No. Of Components	Present in Board/Panel
Touch in TAB_REMOTE	Capacitive Touch Screen	1	Panel
Water Heater Calling Switch in WL_CHGR	Switch, Push button, Through Hole	1	Panel
Water Heater interface in WL_CHGR	Connector, 2pins	1	Panel

4   Mechanical Requirements

4.1   Mechanical Functional Requirements

Below are the various mechanical requirements of TAB_REMOTE and WL_CHGR.

<p align="center">**Table 4: Mechanical Requirements**</p>

Functional Requirements – Hardware - Mechanical			
PR_ID	Requirements in Brief	Requirements in Detail	Proposed Implementation by VVDN
PMR-01	Water Proof	• IPx7	• Suitable Mechanical will be designed
PMR-02	Tablet Dimension	• 195x128x10mm	• Suitable Mechanical will be designed
PMR-03	Wireless charger dimension	• 201x133x32mm	• Suitable Mechanical will be designed

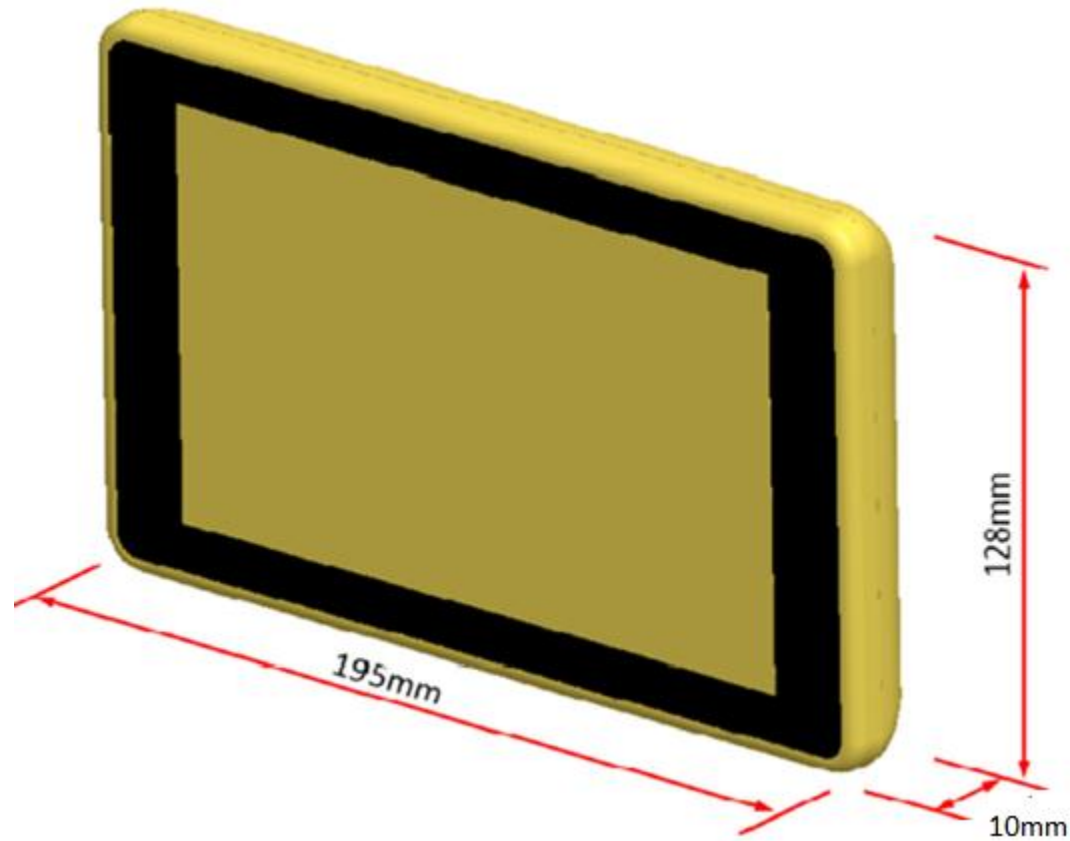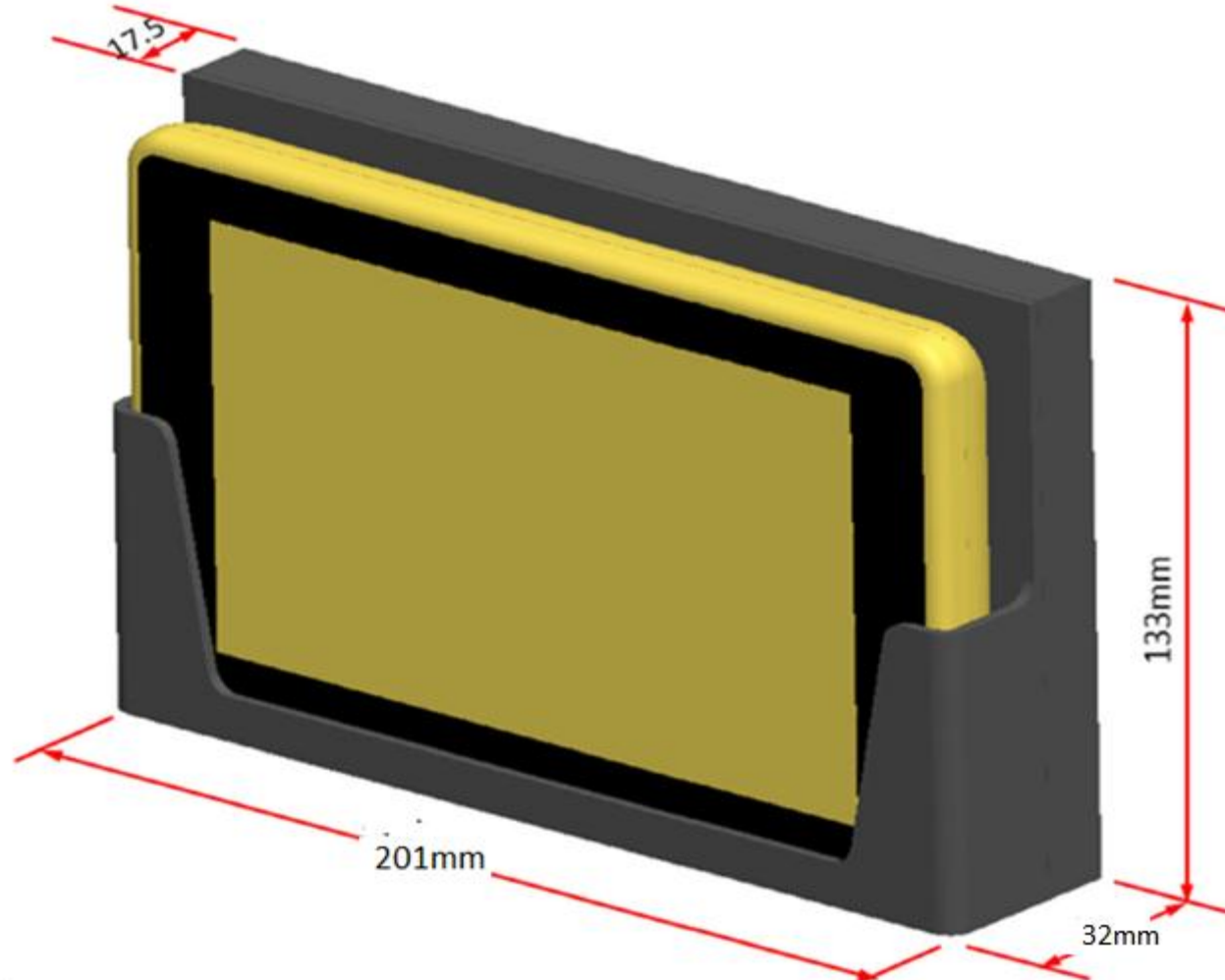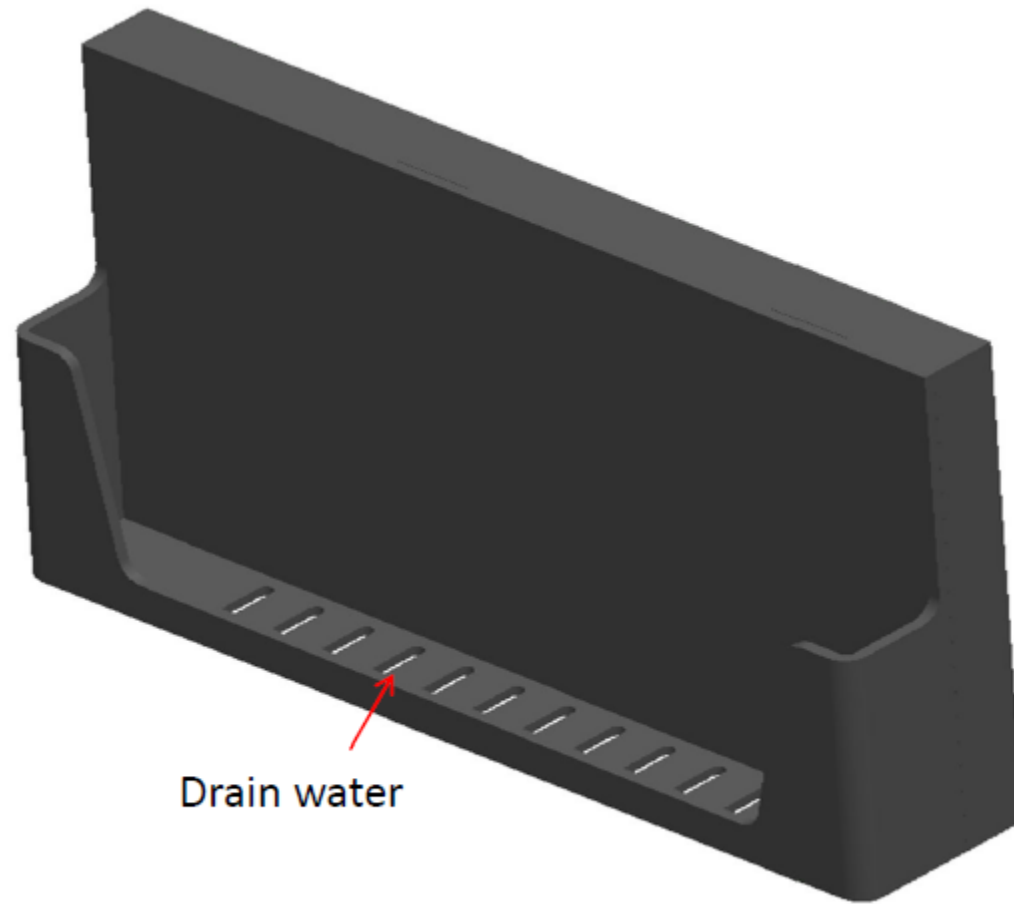## 4.2   Mechanical Conceptual Diagram

Figure 2: Tablet Mechanical Conceptual Diagram

Figure 3: Wireless Charger Mechanical Conceptual Diagram

Drain water

Figure 4: Wireless Charger Mechanical Conceptual Diagram

Note:

- Mechanical diagram with switches will be shared, once we have completed the Mechanical design.

5 Software Requirements

5.1 Software Functional Requirements

Table 5: Software Functional requirements

PSR_ID	Requirements in Brief	Requirements in Detail	Proposed Implementation by VVDN
TAB_REMOTE Firmware			
PSR-01-01	BLE Version	The device must be able to communicate with Wireless Charger with BLE 4.0	• We will be using BLE 4.1 specification which is backward compatible with 4.0
PSR-01-02	BLE Pairing	BLE pairing should be initiate by Tablet during initialization	• During initialization, BLE will be power up and kept in Central Mode. Pairs to Wireless Charger once available.
PSR-01-03	BLE	Should be used for image update and for transferring control signals	• BLE profiles will be chosen accordingly • Control signals would be transferred to wireless charger according to the response from Android Application.
PSR-02	WIFI	WIFI should be used for upgrading images in Tablet and also for Wireless charger.	• Tablet Remote image received from WIFI and updates will be done accordingly. • Wireless Charger image received from WIFI will be transferred to the Wireless charger via BLE interface. • Certain basic features will also be enabled like browsing, audio calling..etc
PSR-03	Fuel Gauge	Battery status should be displayed and also shared with Wireless charger for charging	• Battery status would be monitored via I2C(APQ8009) and shared with wireless charger via BLE for effective charging. I2C driver will be implemented for the same.
PSR-04	Adaptive Display brightness	Brightness of the display should be controlled according to the external lighting	• Ambient sensor would be connected to the processor via I2C and PWM input of display will be controlled accordingly. I2C driver will be implemented for the same.
PSR-05	Touch pad Control	Co-ordinates should be captured to the processor for processing	• I2C driver will be used to capture the co-ordinates of touch input from user and will be processed accordingly.
PSR-06	Display	Display should be interfaced using MIPI-DSI	• MIPI driver will be implemented for controlling the display.
PSR-07	Input Buttons	Tablet control buttons (PWR, Volume+, Volume-)	• IO driver will be implemented and input buttons will be processed accordingly.

PSR-08	Audio interface	Playback of predefined sounds and to enable audio calling.	• Sound playback will be done according the commands from the Boiler via wireless charger. • Audio driver will be implemented to process the Audio output and input.
PSR-09	Memory	Firmware, Database should be maintained in Internal storage	• eMMC driver will be implemented for database management and for placing the firmware.
PSR-10	Operating System	Android 6.0	• Android 6.0 will be used as OS.
TAB_REMOTE Application			
PSR-11	Operating System	Android 6.0	• Android 6.0 will be used as OS.
PSR-12	Remote App	• Remote App Control Page Android app should be developed with all the control buttons and status indication for Tablet and Bathroom water heater, so that user can control and check the status of the water heater.	• All the control buttons and status indication for Tablet and Bathroom water heater will be given available in the App
PSR-13-01	Over The Air(OTA) Communication	Remote App will transmit and receive the data to/from Wireless charger via BLE. • Water heater control transmission • Water heater status reception	• Control and status signals will be communicated through BLE.
PSR-13-02	Over The Air(OTA) Firmware upgrade	Firmware(binary file) upgrade should be done in TAB_REMOTE and WL_CHGR via WiFi and BLE respectively.	Firmware upgrade Procedure • OTA bin file will be uploaded in the server. • Android App will hit request the server to check, whether new version of bin file is available or not. • There will be anAPI to check any update in the bin file version in server. If bin file version is greater than old one, then app will get that server URL and send that URL path to TAB_REMOTE to download the bin file from that path and update their firmware in Tablet (or) Wireless charger. • TAB_REMOTE must have internet connection to download the bin file from that server url path.
PSR-14-01	Battery Charge Status	Battery remaining charge capacity should be shown in the tablet screen.	Battery remaining charge capacity will be shown using special symbol.

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PSR-14-02	Wireless Charging Status	Wireless charging activity should be shown in Tablet Screen.	Wireless charging activity will be shown using special symbol.
WL_CHGR			
PSR-15-01	BLE Version	The device must be able to communicate with Wireless Charger with BLE 4.0	• We will be using BLE 4.2 specification which is backward compatible with 4.1 and 4.0
PSR-15-02	BLE Pairing	BLE pairing should be initiated by Tablet during initialization	• During initialization, BLE will be power up and kept in Peripheral Mode. Pairs to remote tablet
PSR-15-03	BLE	Should be used for image update and for transferring control signals	• BLE profiles will be chosen accordingly. Control signals would be transferred from tablet remote and will be processed and transferred to boiler through POC.
PSR-16	POC	To transfer the control signals from tablet to boiler via Toshiba boiler interface.	• POC driver will be implemented to control the boiler
PSR-17	System status	System status, Boiler power status, charging status should be notified to user	• IO driver will be implemented to control LEDs for system, boiler, charging status appropriately.
PSR-18	Calling switch	This switch should be used to enable/disable Calling	• IO driver will be used to detect the status of switch and enable/disable Calling • Detailed information will be added later, once Paloma give the inputs.

5.2   Tablet Remote Control User Interface Requirements

Figure 5: Remote User Interface

Note:

- Planned User Interface will be same as in FC-E225D, so that User will feel the same User Interface in the Old remote.

6   Architecture

6.1   Hardware Architecture

The hardware architecture of TAB_REMOTE is shown below.
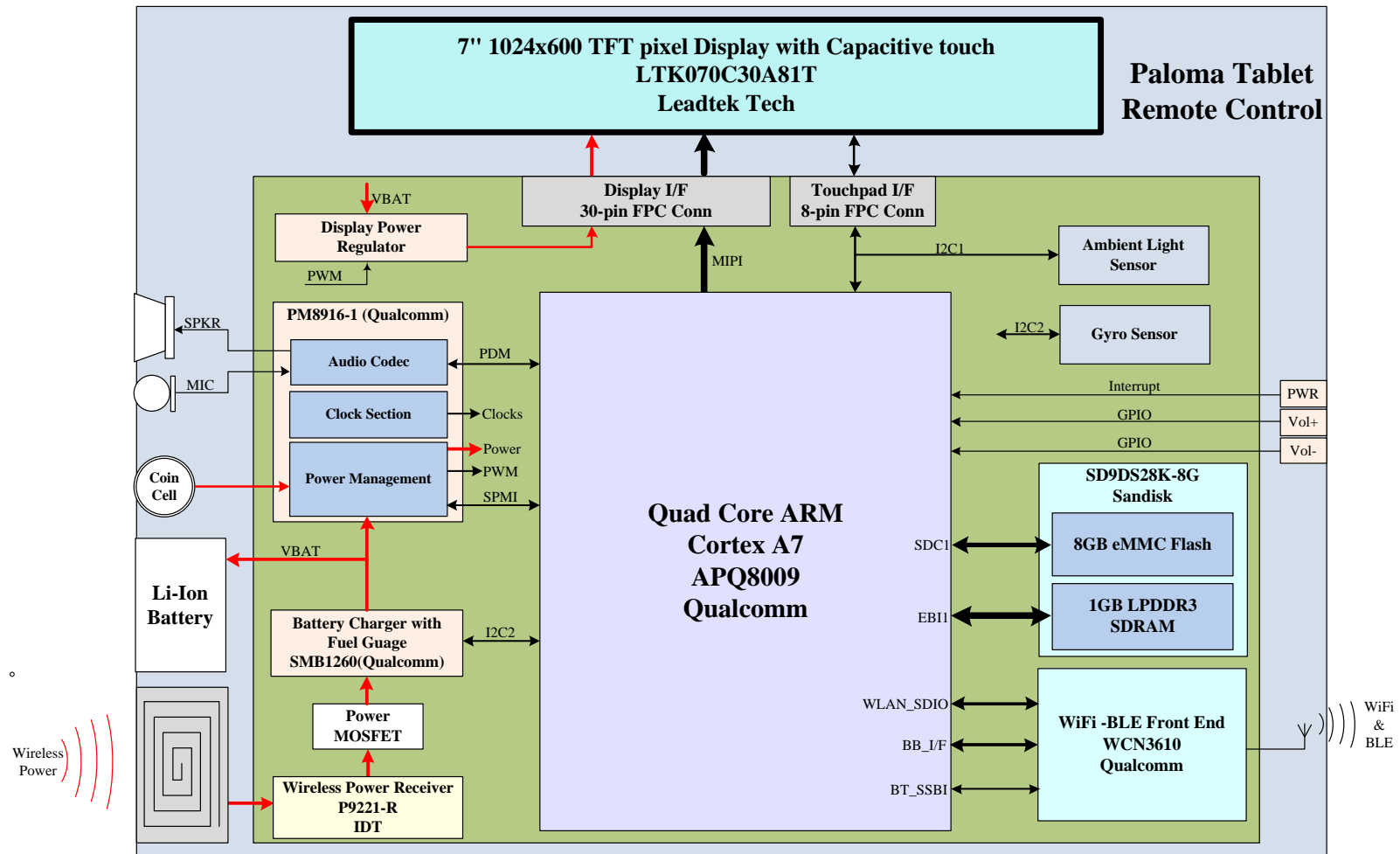
Figure 6: Paloma–TAB_REMOTE HW Architecture

The hardware architecture of WL_CHGR is shown below.

Figure 7: Paloma – WL_CHGR HW Architecture

6.2   Software Architecture

The software architecture of TAB_REMOTE and WL_CHGR are shown below.

6.2.1   Tablet Remote Firmware Architecture

The following block diagram represents the architecture of the system manager. This will show the important applications in system manager and how they communicate with the hardware.

Figure 8: TAB_REMOTE Firmware Architecture

6.2.1   Wireless Charger Firmware Architecture

The following block diagram represents the architecture of the DSP firmware.
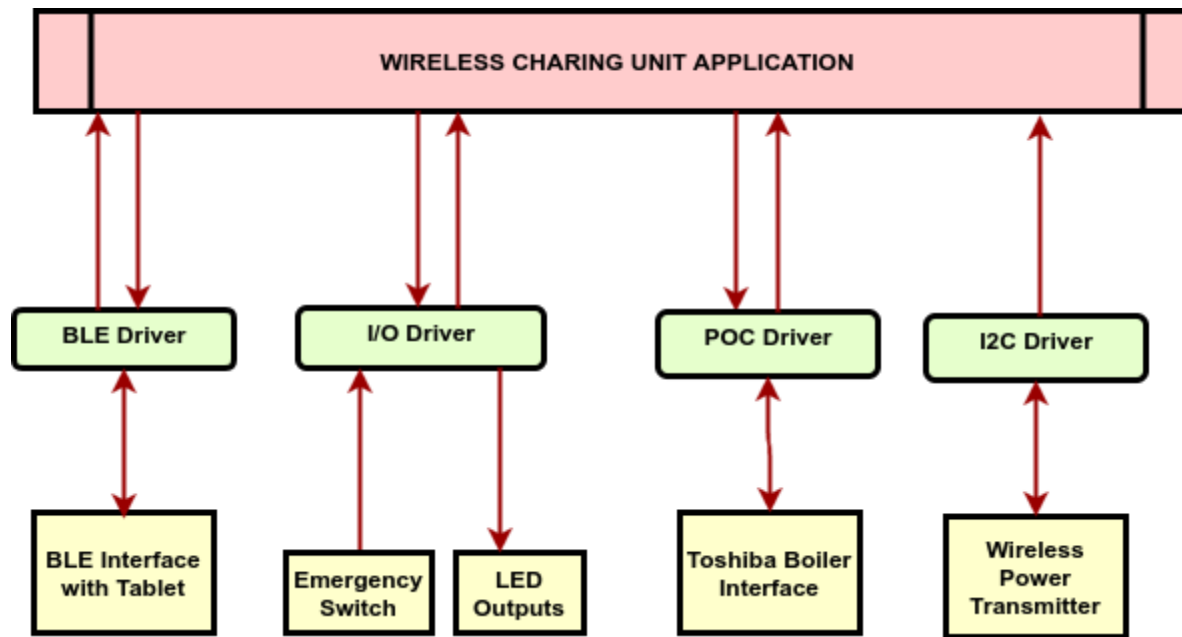
Figure 9: WL_CHGR Firmware Architecture

7 Development Environment Requirements

7.1 HW Development Environment

- Cadence Allegro Design Entry CIS 16.6 shall be used for schematics drafting
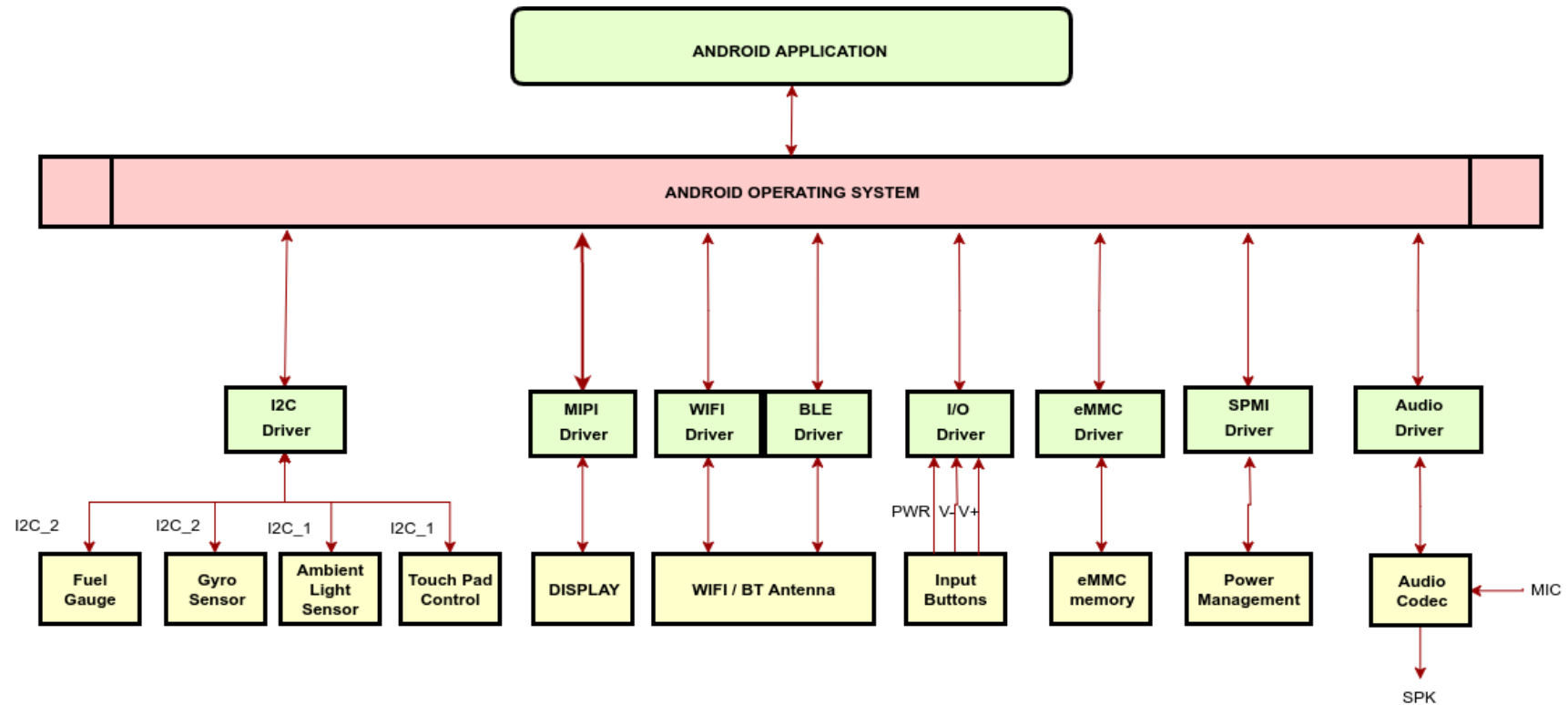- Cadence Allegro PCB editor 16.6 shall be used for PCB layout and artwork

7.2 SW Development Environment

- Qualcomm SDK shall be used for the developing and compiling the software for Qualcomm processor in Tablet Remote.
- Nordic SDK shall be used for the developing and compiling the software for Nordic SoC in Wireless charger.
- Keil IDE shall be used for wireless charger firmware development
- NRF Flash programmer shall be used to burn firmware to the flash.
- 7" APQ8009(Qualcomm) based Tablet with Android 6.0, Wifi and BLE

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8   Use-Cases

The following diagram represents the use cases of the product.
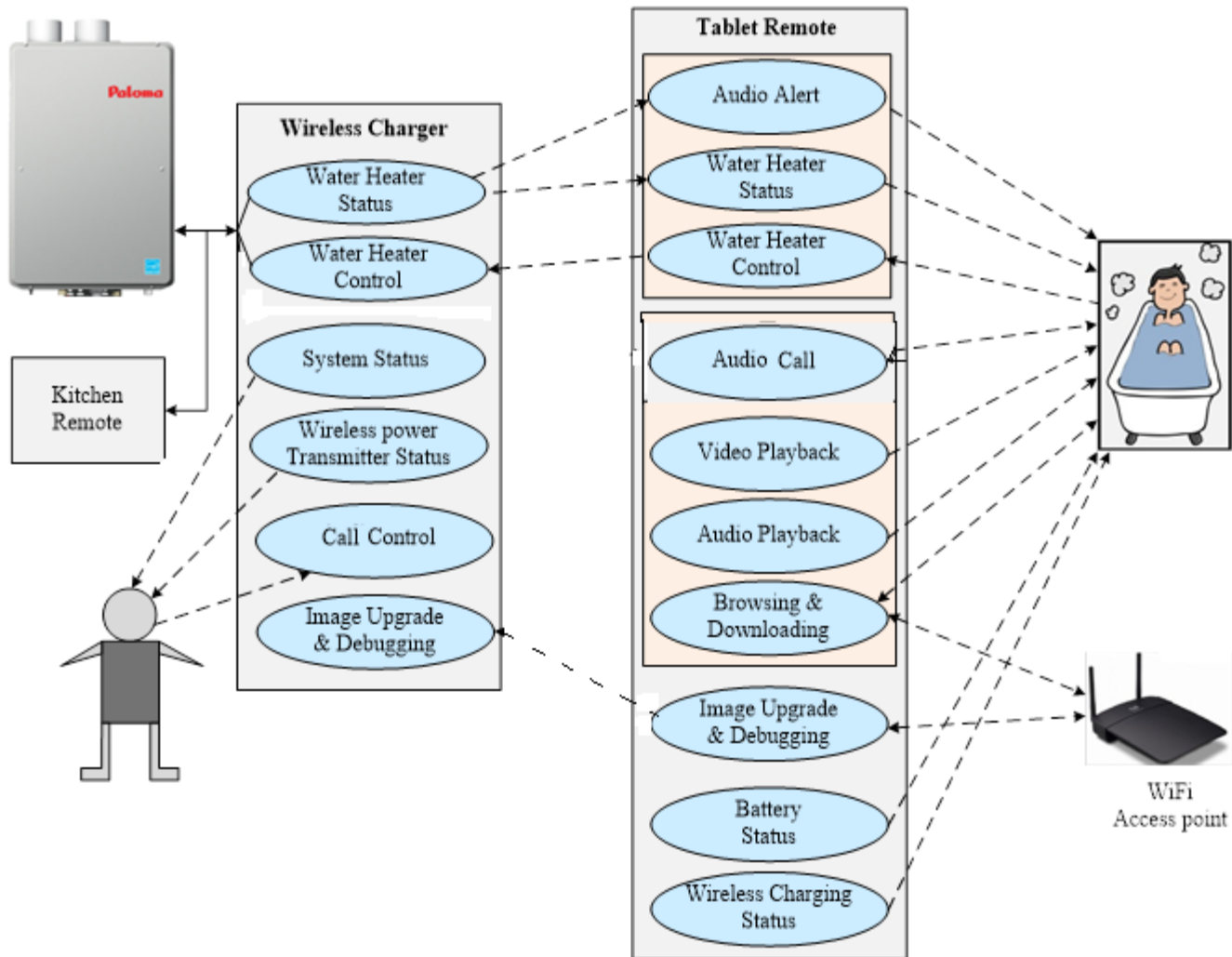
Figure 10: Product Use Case Diagram

9 Compliance

Tablet Remote and Wireless charger need to be certified for below mentioned compliances:

- RF (WiFi& BT)
- VCCI EMC certification
- PSE Certification
- IPx7 Certification

10 List of Tests

During product development activities, below tests will be done.

Hardware Testing
- Electronics Hardware Validation Test
- RF Conducted Transmitted Power test

Software Testing
- Interfaces testing
- Unit testing for Application in Tablet
- Unit testing for Application in Wireless Charger
- Unit testing for Android App

Product Level testing
- BLE and WiFi Range and throughput test
- Product Functionality Test(All the tests can't be done in VVDN; Some tests need to be done in the Paloma Site)

Pre-Compliance Certification testing (will be done in certification labs)
- PSE Certification
- VCCI Certification
- BLE Certification
- WiFi Certification
- Thermal Chamber test
- IP Rating Certification

11 Class-A BOM

The BOM given below is an estimated one, not final Class-A. Final Class-A BOM will be released along with HDD.

<p align="center">Table 6: Tablet Remote Class-A BOM</p>

Si.No	Description	Mfg	Mfg Part No	Qty
1	Processor	Qualcomm	APQ8009	1
2	PMIC for Processor	Qualcomm	PM-8916-1	1
3	WiFi - BT Module	Qualcomm	WCN3610047WLNSP**010VV	1
4	1GB LPDDR2 SDRAM & 8GB eMMC Flash	Sandisk	SD9DS28K-8G	1
5	7" TFT LED Display with 1024x600 pixels	Leadtek technology Co., ltd	LTK070C30A81T	1
6	Qi Wireless power receiver	IDT	P9221-R	1
7	Qi Wireless power receiver antenna		To be selected	1
8	2.4GHz Antenna		To be selected	1
9	WiFi-BT PA & LNA		To be selected	1
10	Analog MIC		To be selected	1
11	Speaker, Monaural, 1W, IPx7		To be selected	1
12	Ambient Light sensor			1
13	PMIC for TFT Display			1
14	0.5mm 30pin FPC connector			1
15	0.5mm 8pin FPC connector			1
16	Push buttons			3
17	Battery		To be selected	1
18	Battery charger & Fuel Gauge	Qualcomm	SMB-1360-0-30-DWLNSP-**-03-0-00	1

Table 7: Wireless charger Class-A BOM

Si.No	Description	Mfg	Mfg Part No	Qty
1	BLE SoC	Nordic Semi	nRF52832	1
2	Qi Wireless power transmitter	IDT	P9242-R	1
3	Water boiler interface chip	Toshiba	T6B70BFG	1
4	MOSFET	TI	CSD97394Q4M	2
5	BLE Antenna	Johanson Tech	2450AT42E0100E	1
6	Qi Wireless power antenna	Wurth Electronik	760308101103	1
7	Green LEDs		To be selected	3
8	Red LED		To be selected	1
9	Switch		To be selected	1
10	Level Translator		To be selected	1
11	2-pin Connector		To be selected	1
12	SPI NOR flash		To be selected	1