

# Wireless Power Bank (WPB) – 1<sup>st</sup> Gen RokForm

Engineering Product Specification

*XTI Part Number: **XR1803-102-01***

*A RoHS Compliant Product*

Revision 1.0

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Fiscal Year (First Shipment Release): 2018



**Revision History**

| Specification |            | Sections | Update Description      | By            |
|---------------|------------|----------|-------------------------|---------------|
| Rev           | Date       |          |                         |               |
| 0.1           | 04/16/2018 | All      | 1 <sup>st</sup> Draft   | Ferdyan Putra |
| 1.0           | 06/15/2018 | All      | 1 <sup>st</sup> Release | KB            |

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## 1.PURPOSE AND SCOPE

### Product Info – An Overview

The RokForm Wireless Power Bank – WPB - was designed as a flexible source of portable power for iPhone users. The WPB has multiple input options, wired through micro USB and wireless through Qi compatible wireless charging. It has multiple output options, wired through USB-A port and wireless through Qi compatible wireless charging.

*The WPB is designed with special care to unit safety and integrates robust protection circuitries. The WPB integrates state of the art fast switching short circuit protections on both input and each of the outputs. In addition, an independent thermal protection circuit implemented to ensure an independent secondary layer of protections. As well, the WPB is designed to have the widest input voltage range in the industry accommodating small and large vehicles in addition to big trucks where the battery voltage surge can go up to 40V range. With superior wide input voltage range between 8V to 40V, the WPB is designed to be robust and rigid in different circumstances. Finally, an independent circuit are integrated in the WPB front end to provide maximum charging efficiency by applying compensations for voltage losses through the charging cable.*

### Bundle Content:

*The Bundle will consist of the following products:*

- *Final Approved Retail Package.*
- *1 unit of the WPB*

### Enclosure/Housing:

*Ruggedized Enclosure*

- *Drop Resistance*
- *IP67 – Water and dust proof*

*Ergonomic design– See Appendix A (CMF)*

*1 X USB-A Port – Universal External Output Charging Port*

*1 X Flap port seal.*

*1 X micro USB Port for Charging Input*

*1 X Push Button Triangle Shape.*

*5 X LED Light indicator. – See Appendix A (CMF)*

### Product Main Features:

- micro-USB input supports the below charging standards:
  - Samsung Adaptive Fast Charging (AFC)
  - USB2.0 - Dedicated Charging Port (DCP)
  - BC1.2, **Apple MFi - Compatible with Apple charging ports**
  - Spreadtrum® Fast Charge Protocol (FCP) popular on Android handsets.
- 1X Universal USB-A Output Charging Port
  - 2.4A Maximum Output Current at 5V compatible with USB2.0 and BC1.2.
  - Compatible with Qualcomm QC2 0QC3.0 and Power Delivery PD2.0.
  - Compatible with iDevices, Samsung, HTC, LG and all USB 2.0 Compliant devices.
  - Automatically Adapts Most Optimized Charging Profile.
  - Automatically compensates for losses due to charging cable to ensure a stable power link.
- 1X Wireless Charging Port (Transmitter/Output)
  - Maximum output power of 10W.
  - Qi compatible.
  - Supports iPhone 7.5W charging requirements.
- 1X Wireless Charging Port (Receiver/Input)
  - Maximum charging power of 5W
  - Qi compatible

## 2. Product Engineering Specifications

### 2.1 Industrial Design

| Description                            | Specs                |
|--|----------------------|
| Detailed CMF (Color/Material/Finishes) | See Appendix A (CMF) |
| Product label and marking size         | See Appendix A (CMF) |

## 3. MECAHNICAL DESIGN Specifications

### 3.1 Mechanical Design Specs

| Descriptions                     | Specs   |
|----------------------------------|---|
| Light Indicator                  | 5 LED Light Indicator   |
| Mechanical Enclosure             | Sealed Mechanical Enclosure Allowing for Maximum Impact Resistance and Water Proof IP67 Standards |
| Seal Type                        | The USB Ports Will be sealed using an independent rubber flab that will act as a water seal.      |
| Mechanical Coupling Requirements | USW and Glue  |
| Parts Coupling                   | USW and Glue  |
| All parts and hardware's         | Must pass salt spray test   |
| All adhesive and glue            | Must pass thermal cycle test (-5°C to 50°C with settle time of 5 hours)                           |

## 4. ELECTRICAL DESIGN Specifications

### 4.1Electrical Design Specs

| Description  | Specs  |
|--|--|
| Input Voltage  | 5V – 9V (Fast Charging)  |
| Output Voltage   | 5V – 9V (Fast Charging)  |
| Charging (general) Standards   | USB2.0, BC1.2, QC2.0, QC3.0, AFC, and MFi  |
| Maximum Output Power USB-A   | 5V/2.4A, 9V/1.2A   |
| Power converter (Input/Output)   | Buck, DC-DC  |
| Light Indicator  | 3x White LEDs for fuel gauging applications<br>(1-LED =30%, 2 LEDs = 30-70%, 3 LEDs = 70%-100%)<br>1x Green LED to indicate proper wireless charging<br>1x Red LED to indicate for error |
| Compatibility  | AFC, MFi, QC2.0, QC3.0, USB2.0 DCP Dedicated charging port to charge all USB compliant devices.  |
| PCB Type (Single Sided, Double Sided Silver thru hole, Double Sided Plated thru hole, Double Sided Carbon) Pcb adopts 4 layers | All circuits and components must be placed in smallest possible footprint to ensure minimum or no impact to the mechanical design.   |
| Safety and Protection circuits   | Safety circuitries must provide short circuit protection, Over voltage protection and dedicated thermal protection circuit.  |
| ESD Protection   | Yes; SMD diode(s)  |

## 4.2 Battery Cell Specs

Please refer to the attached battery specification acknowledgement

## 5. QUALITY CONTROL PLAN

### 5.1 Quality Design Specifications

Must meet XTICosmetic Workmanship Standard Document (mCWSD)

| Descriptions                   | Requirement   |
|--------------------------------|---|
| Gap between plastic components | 0.15 mm max – TBD after T1 Analysis, indeterminate; |
| Part mismatch                  | 0.15 mm max – TBD after T1 Analysis, indeterminate  |
| Part flash                     | 0.1 mm max – TBD after T1 Analysis, indeterminate   |

|                            |                                 |
|----------------------------|---------------------------------|
| Paint scratch / durability | See Test Plan for testing       |
| Gap                        | 0.1mm – TBD after T1 Analysis   |
| Sink Mark                  | No sink marks should be allowed |
| Color match                | Match approved sample           |
| CMF match                  | Match approved sample           |

## 5.2 Environmental Test Specs

| Description                               | Requirement  |
|---|--|
| Operating temperature range               | 0°C to +45°C   |
| Storage (Non-operating) temperature range | -20°C to +60°C   |
| Temperature Shock                         | will be subjected from 0°C to 50°C for 4 cycles at a rate of 1°C per minute with a dwell time of 1 hour at high and low temperature (as shown below). Functional tests will be randomly performed while unit is inside the chamber |
| Humidity (operating)                      | 40±3°C, 95% relative humidity, and non-condensing for 96 hours with batteries or power. Functional tests will be randomly performed while unit is inside the chamber.  |
| Altitude                                  | Must withstand a 10,000-feet altitude test (by simulation). Packaged products must withstand a 20,000-feet altitude test (by simulation)   |
| Vibration                                 | Must withstand the vibration/stress test. The test is performed at amplitude of 3.15 mm and frequency of 7-500 Hz, for 10 minutes (per axis)   |
| Unit Drop test (transit drop)             | Must withstand multiple free-fall drops on a hardwood floor (e.g. a 1.00" thick oak layer) with the surface(s) or edge(s) without obstruction. See Test Plan for details   |
| Chemical resistance                       | See Test Plan for list of chemicals and test methods   |



### 5.3 Functional Test Requirements

1. Each Mass Produced Unit will go through 24-hours of straight burn-in time.
2. Each Unit will go through a fail test simulating extreme operational conditions.

## 6. STANDARD COMPLIANCE

### 6.1 Certifications required for this product

| Certification | Requirement |
|---------------|-------------|
| RoHS          | Yes         |
| FCC           | Yes         |
| CE            | Yes         |
| Prob 65       | Yes         |
| UN38.3        | Yes         |
| UL            | Yes         |

### 6.2 ESD Protection

Standard products must meet 8kV air discharge. Products that have metal casing must meet 4kV contact discharge, as well as 8kV air. All ESD tests shall be performed using the test systems as specified by the IEC 61000-4-2 2001 standard.

**Note:** the first version of the sample is not added to the esd, the second edition of the sample can be added.

### 6.3 EMC Compliance

All EMC tests shall be performed by following the IEC 61000-4-2 2001 standard.

### 6.4 ROHS Compliance (*Restriction of Hazardous Substances*)

The product should be RoHS compliant. The product shall not contain any of the following 6 harmful substances:

- ❖ Lead
- ❖ Mercury
- ❖ Hexavalent Chromium
- ❖ Cadmium
- ❖ PBB (Polybrominated Biphenyl)
- ❖ PBDE (Polybrominated Diphenyl Ether)

## 7.0 Product Behavior and User Interface:

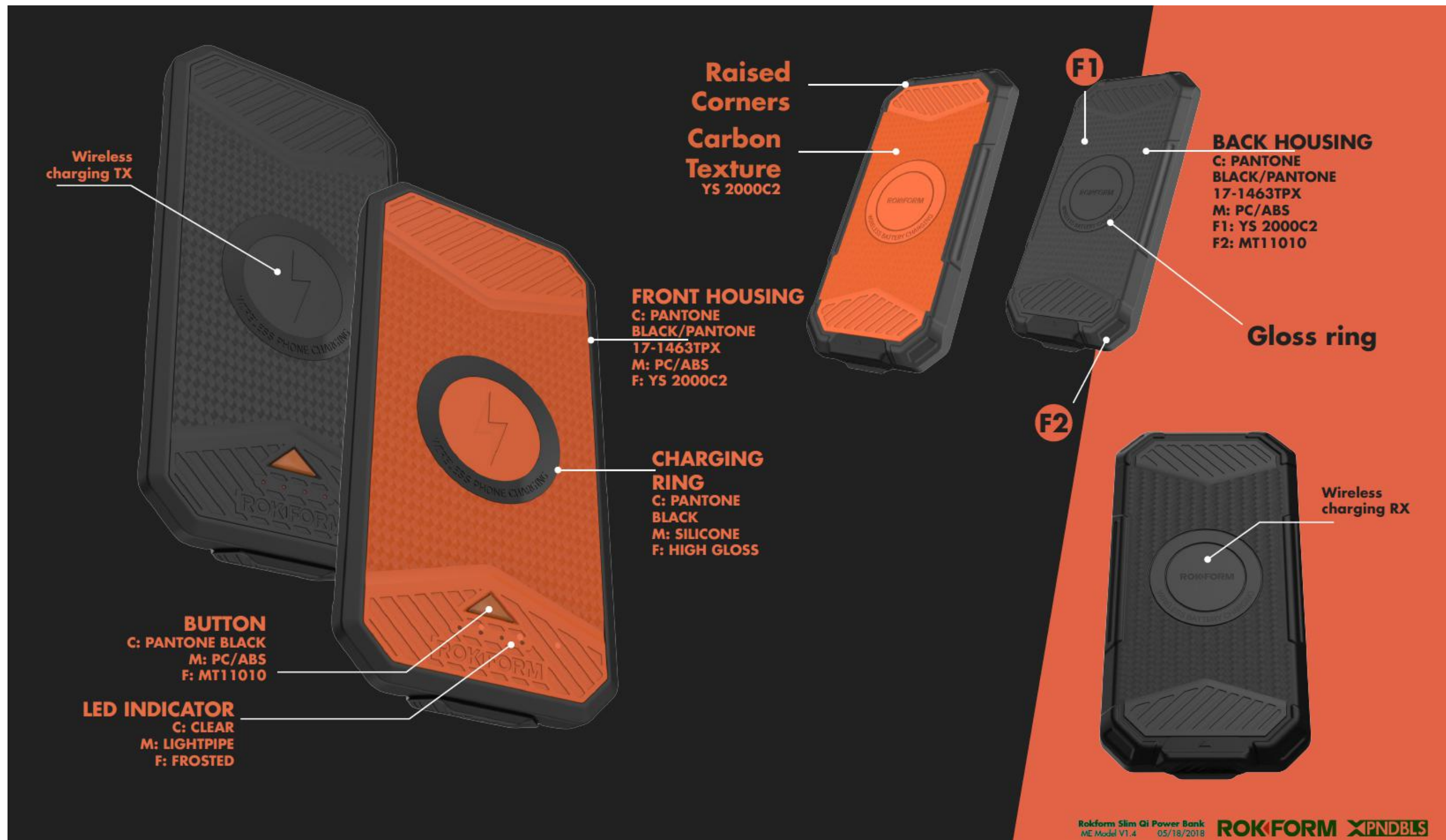
When the RokForm WPB is being charged using the micro USB terminal, the device automatically enables the passthrough power path to enable the 10Watt wireless transmitter. In addition, the device can detect and passthrough the power to the USB-A simultaneously.

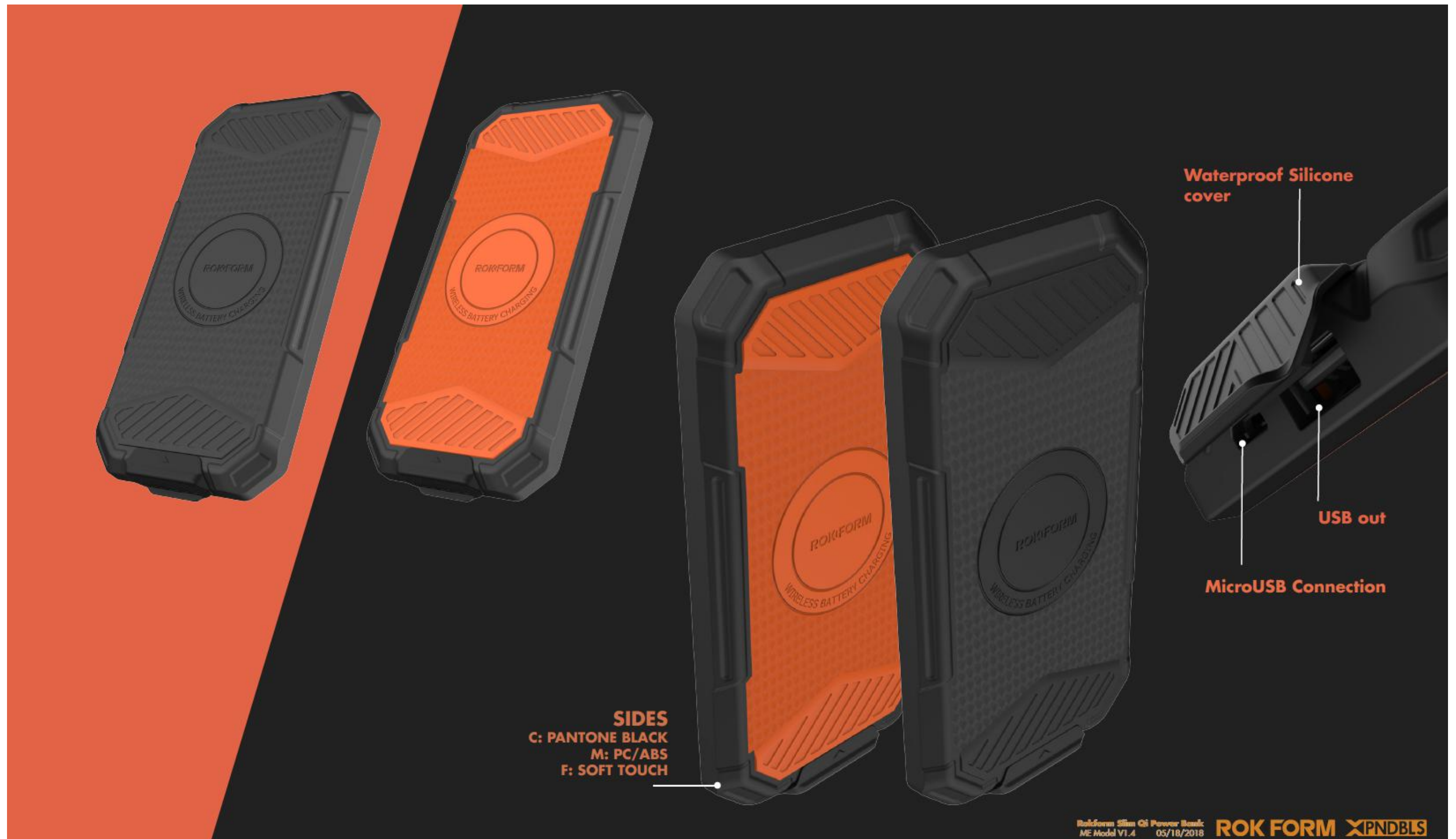
The RokForm WPB has an integrated intelligence to determine the number of devices being charged. The unit dynamically distributes power to both USB-A and Wireless Charging TX port. Maximum output power is 5Watts at the Wireless Charging TX port when the power is being shared with the USB-A port. The output of the USB-A will operate at USB2.0 standards only under such conditions.

The RokForm has a built-in automatic detection implemented at both USB-A and TX ports. This enables the unit to automatically wake up and charge the device upon sensing of presence of external device.

The device is designed to prioritize the charging input from the micro USB over the wireless power RX port. The RX port will only charge the battery and no passthrough(RX power cannot maintain a higher power output, so simply recharge the battery)

**Appendix A: CMF Renderings (Below)**







## **FCC STATEMENT:**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

**Warning:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

## **FCC Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.