THE KI CORDLESS KITCHEN STANDARD

In 2013, the Wireless Power Consortium (WPC) established the Kitchen Work Group to develop a standard for cordless kitchen appliances, and in 2019, the Ki Cordless Kitchen standard was announced. This initiative has been supported by leading corporations in the kitchen and consumer electronics industries, including prominent appliance manufacturers.

This white paper explains the concept and benefits of the Ki Cordless Kitchen standard, which powers cordless appliances ranging from simple low-wattage juicers to kettles and other heating appliances that require up to 2.2kW of power.

The Ki Cordless Kitchen standard enables the development of cheaper, safer, and smarter appliances that will reduce clutter and make cleanup and storage easier in any kitchen. While focusing on interoperability and safety, the standard leaves ample freedom for makers of cordless kitchen appliances and transmitters to design products that provide differentiating features. The Ki Cordless Kitchen standard will be accompanied by a compliance program that will lead to flawless and intuitive interoperability of cordless appliances in kitchens worldwide.

WHAT IS KI CORDLESS KITCHEN?

Ki Cordless Kitchen is a revolution in food preparation and cooking convenience. Small appliances are powered simply by placing them on magnetic power sources (transmitters) that are built into a counter, cooktop (hob), or table. These appliances do not need the power cords that would otherwise be draped across a counter or table and plugged into an outlet. Power to the appliance is instead provided by inductive power transfer, in which a permanently-mounted transmitter draws power from the mains or household power and transfers it using magnetic induction to the appliance. The power is then converted within the appliance back into electrical power or heat for cooking.
Replacing traditional kitchen appliances

Traditional, corded kitchen appliances, such as blenders, mixers, rice cookers, slow cookers, toasters, and more, all share a standard component that has been in use since the early twentieth century: the power cord. While we have all benefitted from the ability to plug virtually any appliance into a wall outlet, it has meant living with the inherent inconvenience of power cords:

- The placement and use of the appliance depend entirely on the location of power outlets.
- The power cord must be long enough to reach the nearest outlet, which means the cord will inevitably clutter up counter space.
- Only a limited number of appliances can be plugged into a single outlet at a time.
- When putting the appliance away, power cords get in the way. You can wind up or secure the cord with a tie or rubber band, but it must be undone before it can be used again.

As seen with the phenomenal growth of wireless technologies such as Bluetooth, Wi-Fi, and Qi wireless charging, people given an alternative to wires and cables never want to go back.

In the kitchen, one very familiar appliance is an excellent example of the cordless trend: the electric kettle.

When the electric kettle was invented, the convenience of boiling water rapidly without putting a kettle on a stove was immediately appreciated. Early electric kettle designers understood that it was both awkward and risky to pour boiling water from a kettle that is plugged into the wall, so some kettles were equipped with a socket in the back to allow the power cord to be removed from the kettle before pouring.

As leaving a plugged-in power cord presented a safety hazard, manufacturers eventually developed an enclosed power base that remains on a counter or table when the kettle is lifted for pouring. No plugging or unplugging of the power base is necessary to lift the kettle, and the base can remain safely plugged in. This concept of the separate power base is such a universally accepted feature that it is now virtually impossible to find an electric kettle without one.

With the advent of Ki Cordless Kitchen appliances, convenience takes another leap forward by rendering the plug-in, countertop power base obsolete and bringing the convenience of cordless appliances to a broader range of devices.

The Ki Cordless Kitchen difference

Unlike traditional kitchen appliances, Ki Cordless Kitchen appliances are intelligent: they communicate with the transmitter to ensure that the amount of power received remains within the limits of the appliance and according to input from the user. Cooking is much more precise, responsive, and repeatable with Ki Cordless Kitchen appliances.

Communication between the Ki Cordless Kitchen appliance and transmitter is based on NFC. The communication begins as soon as the appliance is placed on the transmitter. In addition to controlling the amount power that is transferred, the communication enables "smart" features, such as allowing the transmitter to distinguish between Ki Cordless Kitchen appliances and other objects that should not be inadvertently heated, such as keys, phones, bank cards or other items.

User controls can also be added to Ki Cordless Kitchen pots and pans, providing an alternative to traditional cooktop controls. Cookware can even be designed to be programmed by a smartphone app to specify temperature and timing taken directly from recipes. This is a significant change, placing precise power management in the appliance and replacing analog heat controls on the cooktop. No more guessing whether the temperature in the pan is too hot or too cool. Ki Cordless Kitchen appliances may ultimately end cooking disasters like milk boiling over or a meal that is under-cooked or burned.

ADVANTAGES OF
KI CORDLESS KITCHEN

Designed for interoperability

As seen with many open standards, interoperability is a powerful driver of rapid adoption and worldwide market opportunities. Ki Cordless Kitchen transmitters and
appliances are designed to work with each other regardless of brand. Consumers can use any Ki Cordless Kitchen appliance on any compatible transmitter, whether in a different room or in a different house—just as a corded appliance can be plugged into any compatible outlet in any building.

This interoperability gives the product maker the option to focus on developing differentiating product features and frees the consumer and integrators from worrying about being locked into a particular brand or proprietary technology. All they have to do is look for the Ki Cordless Kitchen logo when they are shopping for new or replacement products.

Flexible power transmitter locations
In new kitchens, the power transmitters for Ki Cordless Kitchen appliances can be integrated directly into kitchen counters and furniture or added to induction cooktops. Existing kitchens can use Ki Cordless Kitchen appliances too, as counters and furniture may be retrofitted with transmitters, in many cases installing them directly beneath the surface.1

Since Ki Cordless Kitchen transmitters are usually installed underneath kitchen counters and tables, the transmitter and its wiring are out of sight and protected from spills and accidents. The most commonly used non-metallic materials for counters and furniture are fine for Ki Cordless Kitchen use, including granite, wood, marble and composites up to three centimeters (about one inch) thick. For thicker surfaces, a recessed area underneath can be created for the transmitter.

Transmitters based on the Ki Cordless Kitchen standard are designed to provide up to 2.2 kW of power to easily handle the demands of heating appliances, such as kettles, hot pots, rice cookers, toasters, and more.

Safety improvements
Unlike old-fashioned appliances, Ki Cordless Kitchen appliances carry no inherent risk of electrical shock, due to the following:

- There is no power cord to fray or accidentally cut while it is plugged in.
- Liquids spilled on the appliance or between the appliance and transmitter will have no effect on operation or safety.
- The appliance immediately stops receiving power if it is knocked over or moved off the transmitter location.

The Ki Cordless Kitchen standard also helps prevent burns. This is because the standard requires that the bottom surface of appliances and cookware will never be too hot to touch, and that the work surface will never get hot due to the operation of a Ki Cordless Kitchen appliance.

Safeguards built into the system will also ensure that any objects placed on a transmitter, such as a kitchen knife or other utensil, will not be accidentally heated. The transmitter will only provide power when the presence of a compatible appliance and the absence of stray objects are confirmed.

Finally, Ki Cordless Kitchen appliances are designed to comply with local regulations, including those regarding safety, EMC (emissions, disturbances, and immunities), EMF exposure, and energy consumption. The emission levels associated with the transmitter will be similar to those of conventional induction cooktops.

Ki Cordless Kitchen efficiency
Ki Cordless Kitchen appliances are required to operate at efficiencies greater than 90% of equivalent appliances that use power cords. The difference in usable power is negligible and is unlikely to be noticed in daily usage.

KI CORDLESS KITCHEN EXAMPLES
Under the Ki Cordless Kitchen standard, virtually any type of kitchen appliance can be made cordless. Examples include mixers, juicers, kettles, rice cookers, bread makers, coffee makers, wine bottle chillers, slow cookers (crock pots), griddles, toasters, and deep fryers.

This section describes three common use cases that illustrate the Ki Cordless Kitchen concept:

Hybrid cooktop
Hybrid cooktops, or hobs, combine a Ki Cordless Kitchen transmitter with a traditional induction cooktop. In addition to providing traditional heating for cookware designed for induction cooktops, Ki Cordless Kitchen appliances draw their power from transmitters underneath the surface of the cooktop. This versatility can be a welcome help to a cook when preparing multiple dishes at the same time.

Ordinary induction cookware does not have an integrated power receiver and so requires cooktop controls to manually set the temperatures. Ki Cordless Kitchen appliances have their own integrated controls and in some cases may be programmed remotely using a smartphone or other device.

On a kitchen counter
A transmitter can be installed directly beneath almost any type of kitchen counter. And as any Ki Cordless Kitchen appliance can be used with the transmitters, an entire meal can be prepared at the kitchen counter.
Using cordless appliances on a kitchen counter

This photo shows the use of a direct heating appliance on the countertop, completely eliminating the need for a traditional stove or induction cooktop, as power from the transmitter directly heats the induction cookware. The cookware is smart, in the sense that it has controls to set the optimal temperature for cooking, and also because it instructs the transmitter to provide the exact level of power that it needs.

Cordless pans are also made with a layer of thermal insulation underneath to prevent heat damage to the countertop. In fact, the surface of the counter and even the bottom of the cookware will not be very hot to the touch, making it safe even near children.

Finally, note that the rice cooker in the photo is not perfectly aligned on the transmitter. Users do not have to be very precise when placing their cordless appliance over the transmitters, as there is a five-centimeter (two inches) tolerance in the alignment.

At the dining table

As a Ki Cordless Kitchen transmitter can be installed in almost any flat surface, a family can even use their appliances at the dining table. This brings the convenience to use a toaster, egg cooker, or heating plate on the table with no power cords dangling between the table and wall outlet, which would present a hazard, especially with small children present.

Any Ki Cordless Kitchen appliance can be used at a table that is properly equipped with transmitters. Table-top cooking is particularly popular in Asian cuisine, such as Chinese hot pot cooking, Japanese shabu shabu and sukiyaki, and Korean grilling. Western cooking can also be done at the table with Ki Cordless Kitchen appliances, such as toasting bread, cooking bacon or pancakes with a griddle, heating cheese fondue, and more.

The versatility of Ki Cordless Kitchen appliances expands the possibilities of tabletop cooking and makes it much easier in terms of set up, clean up, and putting appliances away.

INVITATION TO PARTICIPATE

Join the WPC to participate in developing and growing the Ki Cordless Kitchen standard. By joining the WPC Kitchen Work Group, you will be able to present your views and influence the specification, and get early access to draft specifications and other technical resources.

Membership is appropriate for companies in the kitchen and consumer electronics industries, including makers of:

- Small kitchen appliances
- Built-in kitchen appliances, such as stoves and induction cooktops
- Components, including coils and ICs
- Cookware
- Kitchen counters
- Kitchen and dining room furniture

Kitchen retailers, integrators, and other interested parties are also encouraged to contact the WPC for further information and are cordially invited to attend any of our several trade shows held every year in North America, Europe, and Asia.

For more information on the Ki Cordless Kitchen Standard, please visit wirelesspowerconsortium.com/kitchen

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1 Retrofits may require electrical upgrades, which may require a local building or construction permit in some regions, as well as a qualified electrician to ensure safe wiring and adequate power circuits. A transmitter requires a regular 200-240 or 100-120 Volt AC outlet.