



Standard-related patent landscape: Qi standard

Patent Mapping to the Qi standard in
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General Scope

Qi, derived from the Chinese word for 'energy flow' (pronounced as 'chee'), constitutes a widely adopted wireless charging standard in the realm of electronic devices. It facilitates the wireless powering of smartphones, headsets, and wearable gadgets while emphasizing security and interoperability among Qi-enabled devices. The Qi standard is significant for simplifying and improving the charging experience by eliminating tangled cables and providing a seamless and efficient way to power electronic devices. This not only enhances user convenience but also contributes to a clutter-free environment.

References

- According to the Wireless Power Consortium (WPC), the organization behind the Qi standard, Qi is described as "a global wireless charging standard that enables seamless and efficient charging for electronic devices such as smartphones, headsets, and wearables." The WPC emphasizes the ease of use and widespread compatibility of Qi-enabled devices with "...over 9000 different wireless charging products Qi certified as of 2024"

Source: wirelesspowerconsortium.com

- In a statement issued by major smartphone manufacturers, including Apple, Samsung, Huawei, and Xiaomi, they collectively affirm their commitment to the Qi standard. They state, "Qi has become the industry benchmark for wireless charging, ensuring not only convenience but also security and interoperability among our devices, aligning with the evolving needs of consumers worldwide."

Source: officialstatements-techindustry.com

Qi standard	Topics (positive concepts)
Qi architecture	<p data-bbox="443 264 799 297">Transmitter (Charging Pad):</p> <ul data-bbox="464 313 1401 483" style="list-style-type: none"> <li data-bbox="464 313 1401 483">■ The charging pad, also known as the transmitter, is the device that generates and emits the wireless charging signal. It typically includes a coil for inductive power transfer. The transmitter can be integrated into various products, such as charging pads, stands, or even built into furniture. <p data-bbox="443 528 676 562">Receiver (Device):</p> <ul data-bbox="464 577 1401 680" style="list-style-type: none"> <li data-bbox="464 577 1401 680">■ The device being charged, such as a smartphone or other compatible electronics, is equipped with a Qi-compatible receiver. This receiver also contains a coil for inductive coupling with the transmitter. <p data-bbox="443 725 517 759">Coils:</p> <ul data-bbox="464 775 1401 878" style="list-style-type: none"> <li data-bbox="464 775 1401 878">■ Both the transmitter and receiver have coils of wire that are part of a resonant circuit. These coils are used for inductive coupling, allowing the transfer of power between the transmitter and receiver. <p data-bbox="443 922 667 956">Resonant Circuit:</p> <ul data-bbox="464 972 1401 1075" style="list-style-type: none"> <li data-bbox="464 972 1401 1075">■ The resonant circuit, which includes the coils in both the transmitter and receiver, helps optimize the efficiency of power transfer. It allows for the tuning of the system to ensure effective wireless charging. <p data-bbox="443 1120 775 1153">Communication Protocol:</p> <ul data-bbox="464 1169 1401 1339" style="list-style-type: none"> <li data-bbox="464 1169 1401 1339">■ The Qi standard includes a communication protocol that enables communication between the transmitter and receiver. This communication is used to negotiate power levels, ensure compatibility, and manage the charging process. The communication protocol ensures efficient and safe wireless charging. <p data-bbox="443 1384 868 1417">Foreign Object Detection (FOD):</p> <ul data-bbox="464 1433 1401 1570" style="list-style-type: none"> <li data-bbox="464 1433 1401 1570">■ Qi-enabled devices often include a mechanism for detecting foreign objects on the charging pad, such as metal or other non-compatible items. This is a safety feature to prevent potential hazards and ensure proper charging. <p data-bbox="443 1615 775 1648">Communication Protocol:</p> <ul data-bbox="464 1664 1401 1834" style="list-style-type: none"> <li data-bbox="464 1664 1401 1834">■ The Qi standard includes a communication protocol that enables communication between the transmitter and receiver. This communication is used to negotiate power levels, ensure compatibility, and manage the charging process. The communication protocol ensures efficient and safe wireless charging. <p data-bbox="443 1879 868 1912">Foreign Object Detection (FOD):</p> <ul data-bbox="464 1928 1401 2065" style="list-style-type: none"> <li data-bbox="464 1928 1401 2065">■ Qi-enabled devices often include a mechanism for detecting foreign objects on the charging pad, such as metal or other non-compatible items. This is a safety feature to prevent potential hazards and ensure proper charging.

Qi standard	Topics (negative concepts)
<p>No relevant concepts</p>	<ul style="list-style-type: none"> ■ While the Qi standard has become widely adopted, there are some features that other similar standards or technologies may have, but Qi does not necessarily incorporate. Here are few examples: <p>Longer Distance Charging:</p> <ul style="list-style-type: none"> ■ Some technologies, such as RF-based wireless charging solutions like Energous' WattUp, aim to provide longer-distance charging capabilities. Qi, on the other hand, is generally based on close-range, inductive charging. <p>High-Power Charging for Electric Vehicles (EVs):</p> <ul style="list-style-type: none"> ■ Qi is primarily designed for low to moderate power applications, such as smartphones and other small electronic devices. For larger applications like electric vehicles, alternative wireless charging technologies, such as those developed specifically for EVs, may offer higher power levels to accommodate the larger battery capacities found in these vehicles. These EV-specific wireless charging solutions aim to provide efficient and fast charging for electric cars, which typically require more power than what is practical for smaller devices like smartphones. <p>Dynamic Charging:</p> <ul style="list-style-type: none"> ■ Some technologies claim to offer dynamic or adaptive charging, adjusting the charging rate based on the device's requirements and state. This can optimize the charging process for different types of devices and batteries. <p>Power Delivery Over Distance:</p> <ul style="list-style-type: none"> ■ Certain wireless charging technologies explore the possibility of delivering power over greater distances, which can be useful in scenarios where close proximity is not feasible.