



We are the link
between the real and
the digital world.

OPTIGA™ Trust Charge

Authentication for Wireless Charging for consumer and industrial applications

Infineon's virtual show 2020



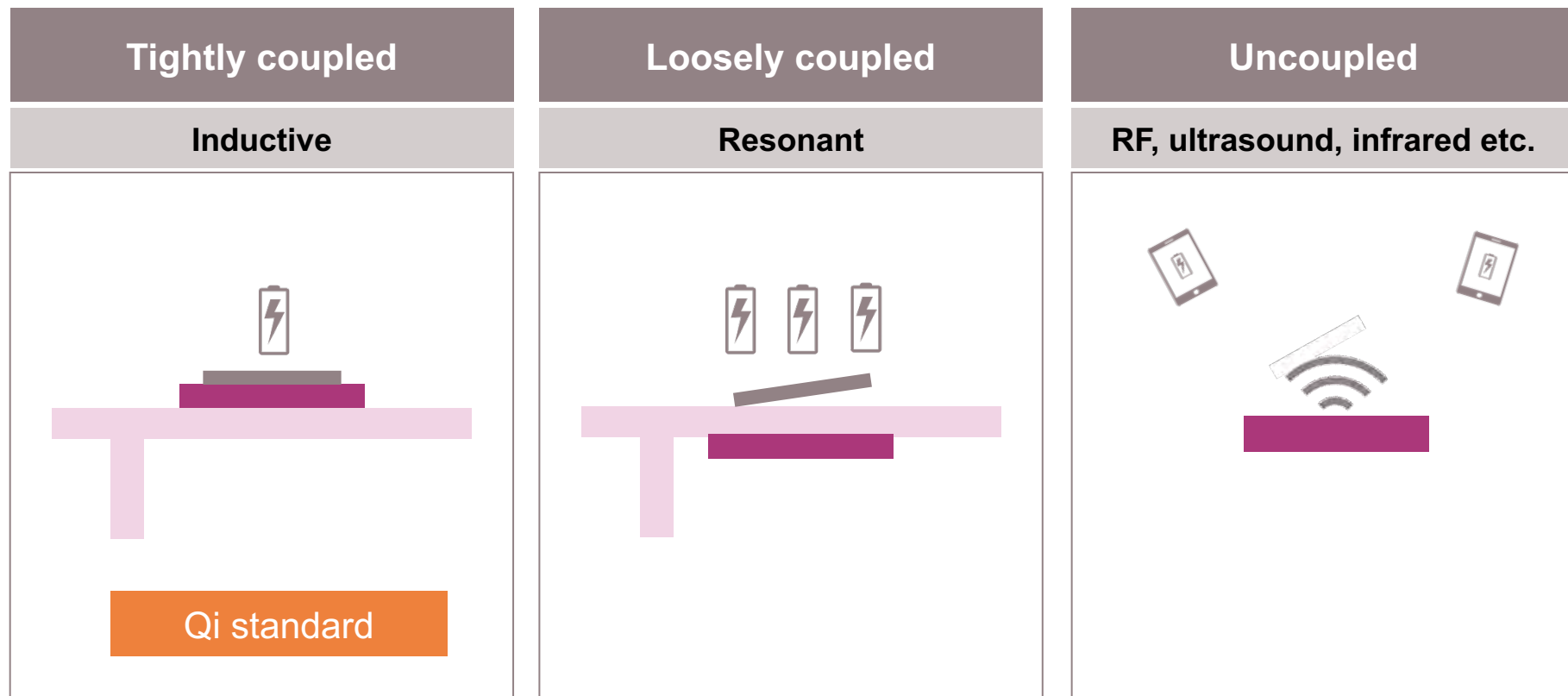
Imagine... a world without wires





Wireless charging Market trends Challenges & opportunities

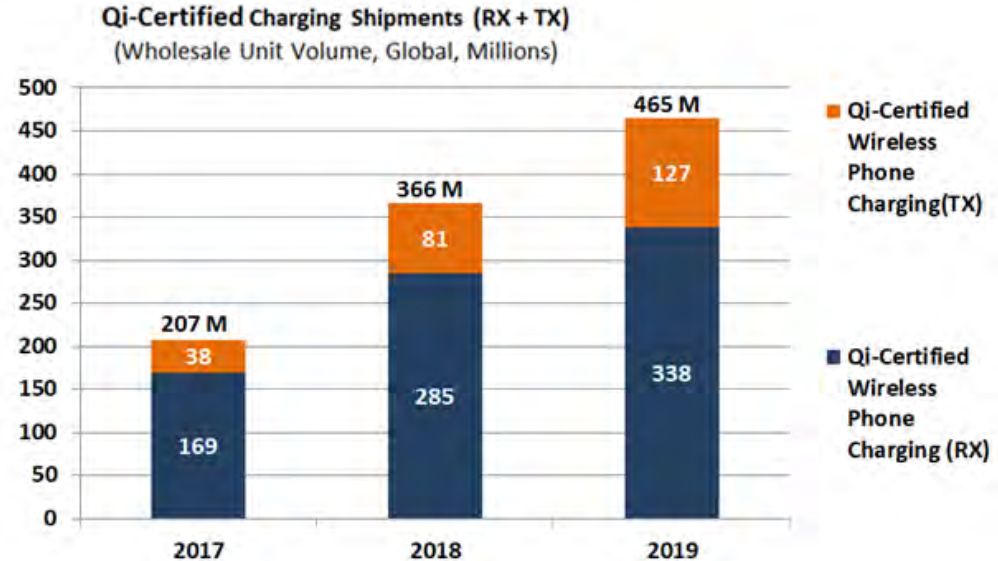
The world of wireless charging is divided into 3 standards



Strong growing adoption of the Qi standard as leading wireless charging standard



- › Over **1 M Qi devices / day** shipped in 2018 (*"The Millionaires Club"*)
- › In **2019** total shipments of Qi devices:
465 M = 1.27M / day
 - Power receivers: 338 M units
 - Power transmitters: 127 M units
- › Steady **Qi growth: 27% y/y in 2019**
 - Receivers: 19% y/y
 - Transmitters: 57% y/y



RX= Power Receiver
TX= Power Transmitter

Source: Strategy Analytics, Global Wireless Charging Tracker, May 2020

The leading wireless charging standard Qi is developed by the Wireless Power Consortium WPC

The Wireless Power Consortium

- › Standard development group for **wireless charging standards**
- › Best known for **Qi**, the leading wireless charging standard for smartphones and other handhelds
- › Driven by **major global mobile phone manufacturers** like Apple, Google, Huawei and Samsung
- › Targets:
 - **worldwide compatibility and interoperability** of all wireless chargers and wireless power sources
 - **safety of devices** (batteries) **and consumers**
- › More than 5000 [Qi Certified products](https://www.wirelesspowerconsortium.com)
- › Qi certified products allowed to carry the Qi logo



<https://www.wirelesspowerconsortium.com>

Challenges of wireless charging lead to a new standard Qi 1.3

- 
- A background image showing a smartphone on a wooden surface, with a green wireless charging pad and a red Qi symbol visible in the blurred background.
- › Growing use of "**fast charging**" with currents $>5W$
 - › With higher currents, **risk of product damage or safety hazards** increases

New standard to **reduce risks for products and people**

- › Qi 1.3 release expected end of 2020
- › Mandates **strong cryptographic authentication** of the charger to the charged device for fast charging. The use of **CC/EAL4+ high certified hardware** (minimum) is recommended
- › Power receiver can digitally verify if the transmitter is trustworthy and Qi certified

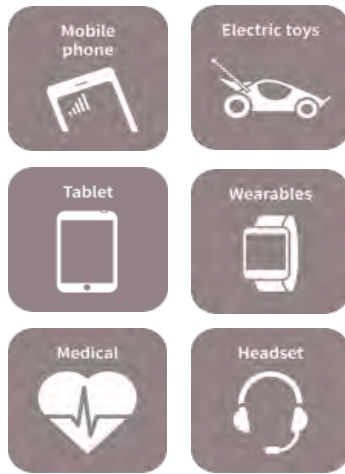
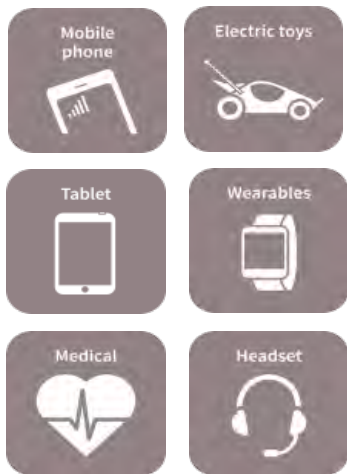
The Qi standard includes different power profiles

Qi BBP Baseline Power Profile
Charging up to 5 W
No authentication needed

Qi EPP Extended Power Profile
Charging 5 -15 W
Mandatory authentication
Release in CY 2020

Extension to 60 W planned
Mandatory authentication
Expected in CY 2021

Application examples



Qi wireless charging > 5 W requires strong cryptographic authentication between charger and device
HW based security recommended but still under discussion

Benefit of Qi certification and OPTIGA™ Trust Charge as authentication solution

Benefits of Qi certification for manufacturers

Quality seal proves safety of devices

Bigger market potential of Qi compatible devices

Increased customer satisfaction with use of fast charging across brands

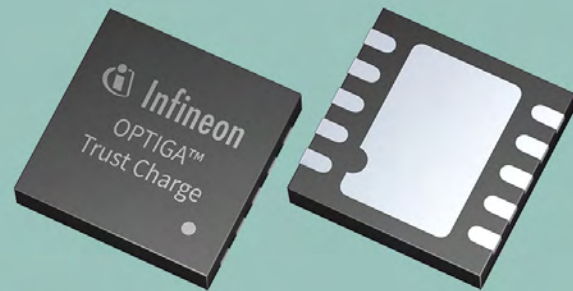
Authentication required

Turnkey authentication solution:

OPTIGA™ Trust Charge

A highly optimized solution to address and simplify the security requirements of Qi 1.3 compliant wireless charging

OPTIGA™ Trust Charge
Making authentication for
wireless charging easy



OPTIGA™ Trust Charge is the authentication solution supporting Qi 1.3 wireless charging – for consumer and industry products



OPTIGA™ Trust Charge

Easy integration

- › Full turnkey solution for authentication for wireless charging (Qi 1.3)
- › Full system integration support
- › Customer specific certificate provided (provisioning)
- › Host code and **application notes** available

Security features

- › Based on CC EAL 6+ (high) certified security controller
- › X.509 / WPC certificate format supported
- › Authentication based on ECDSA NIST-P256
- › Cryptography support: ECC256, SHA-2

Key features

- › I2C serial communication
- › USON10-2 package (only 3x3mm)
- › Extended temperature range available

Deliverables

- › **Full turnkey solution = hardware / software / drivers / host library / certificate(s) & key material injection**

How does wireless charging work?



Schedule:

- | | |
|-------------------------|------------------------------|
| › Engineering samples | available |
| › Qualification samples | available |
| › Mass production | after release of Qi 1.3 spec |

OPTIGA™ Trust Charge

Authentication for Qi 1.3 compliant wireless charging



Receiver



Transmitter

Customer

Infineon



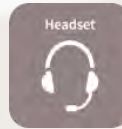
OPTIGA™ Trust Charge is optimized for wireless charging of consumer electronics and industrial applications



Authentication with OPTIGA™ Trust Charge for 5-15W charging according to Qi extended power profile



Wireless charging of mobile phones & tablets



Wireless charging of wearables, accessories etc.



Wireless charging of health tec devices



Wireless charging of building automation devices

OPTIGA™ Trust Charge

Key features and benefits



OPTIGA™ Trust Charge

An easy way to authenticate wireless charging

Easy authentication for Qi 1.3 wireless charging

Supports authentication according to WPC's Qi 1.3 security requirements

Exceeds WPC's security requirements

Common Criteria EAL6+ (high) certified hardware vs EAL4+ (high) requirement

Easy integration of security & Easy logistics for key material

WPC specific personalized keys and certificates preloaded in secured Infineon fabs
No customer investment in infrastructure

Easy integration of full turnkey design reduces effort and time at customer

Integration support including embedded software, host software, development board, reference board and documentation

High flexibility

Small package optimized for small devices
Temperature ranges support wide range of consumer and industrial applications

OPTIGA™ Trust Charge

Support material



Visit the Infineon website for more product information

- › Product presentation
- › Product brief
- › Videos and trainings (in work)
- › Collaterals, brochures etc

- › <http://www.infineon.com/optiga-trust-charge>
- › <https://www.infineon.com/applications/wireless-charging>

Visit Github for detailed technical information


- › Datasheet
- › Host library
- › Appnote
- › Solution reference manual
- › Infineon I2C protocol spec
- › Getting started guide
- › Release notes

- › Host Library and Getting Started: **Public** on GitHub
<https://github.com/Infineon/optiga-trust-charge>
- › WPC Qi Authentication AppNote: **Private** on GitHub prior to official release of the standard. Customers (WPC members) receive access
<https://github.com/Infineon/wpcqi-optiga-trust-charge>

Get to know our evaluation board

- › Evaluation board
- › Reference design (in work)

- › www.infineon.com/OPTIGA-Trust-Charge-kit

 All documents are NDA free after release of the product and release of the Qi 1.3 standard.



Part of your life. Part of tomorrow.