

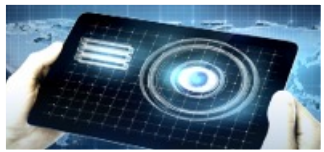


Amphenol[®]
MCP

Qi2 MAX Tx Module Introduction

Amphenol MCP
MCP - Mobile Consumer Products

2023-12



Mobile Devices

12 %



IT & Datacom

21 %



Mobile Networks

5 %



Broadband

4 %

\$12.6B
2022 Revenue

91,000+
Employees

Manufacturing in **40** countries

Sales across **70** countries in
6 continents

Automotive

20 %



Industrial

25 %



Military

12 %



Commercial Aerospace

2 %



Partnership to bring Qi2 to market

- Amphenol, NuCurrent and NXP partner to bring Qi2 technology to market
 - <https://www.amphenol-cs.com/connect/qi2-max-plug-and-play-wireless-module.html#>

- Wireless Power IP
- Systems Technology
- Design Capabilities
- WPC Member



- Chipset Leader in WPC
- Technology Leader
- WPC Member/Contributor



All Members of:

WIRELESS POWER

CONSORTIUM

- Antenna Technology
- Reference Designs
- Manufacturing
- WPC Member

Amphenol

What is Qi?

- Qi is a standard for wireless energy transmission. It's a format that's maintained by the Wireless Power Consortium (WPC), and it aims to standardize wireless charging for 5-15 watts of power to small personal electronics.
- The WPC uses a network of independent authorized test labs around the globe that test specific properties for safety, interoperability, and usability, each of which can involve multiple test procedures. Only Qi Certified products are allowed to carry the Qi logo.

Amphenol Member of

WIRELESS POWER

CONSORTIUM

Coming soon: Qi2

- More efficient and faster
- Future enhancing
- More sustainable

2023 –
WPC announced a new charging standard called **Qi2** in CES.

2021-Q1.3 was released by adding Authentication Request

2017 -
Apple introduces wireless charging in their 10th anniversary iPhone X model, together with the iPhone 8 and 8 Plus.

2015 -
WPC introduces the **Qi1.2** Extended Power Profile (EPP) specification which supports up to 15 W.

2012 -
The Alliance for Wireless Power (A4WP) and the Power Matter Alliance (PMA) are founded. **Qi1.1** was released

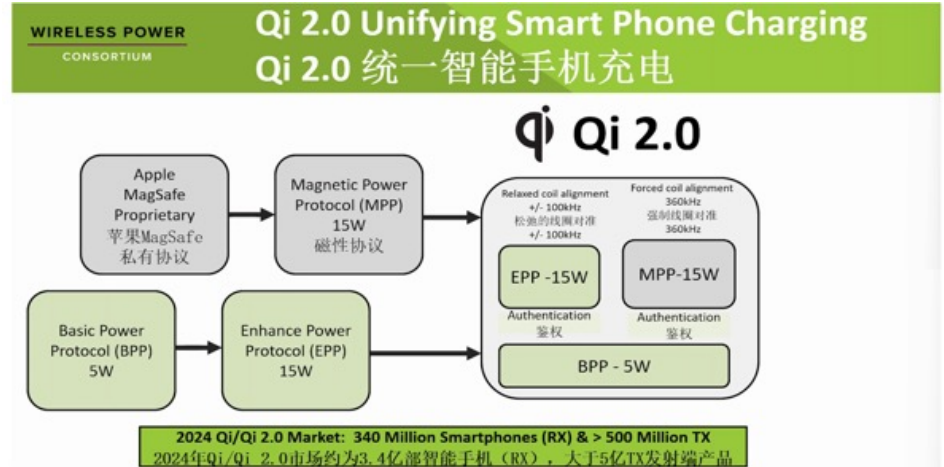
2010 -
The WPC establishes the **Qi1.0** Standard.

2008 -
The Wireless Power Consortium (WPC) is established.



New Features

- Higher charging power
 - Charging power Qi2 up to 15W
- Fast and safe UX
 - Qi2.0 Magnetic Alignment (similar to Apple Watch or Apple Phone), Qi1.3 No Magnets
- Qi2.0 Operates at 360KHz, Qi1.3 operates at 100-200KHz
- Qi2.0 better Foreign Object Detection protection
- Prevent fragmentation of standard body with the addition of Apple's MPP VS EPP
- All devices will require authentication to ensure properly certified devices. This creates separation from low quality solution currently in the market.
- New certification spot testing for in-field products.



“Qi2 is NOT Qi1 with Magnets”

Qi2 is a completely new standard, new frequency, new authentication, new security, and new, more stringent testing, including after-market spot checks to monitor ongoing quality and compliance that can lead to product takedowns and recalls.

It will ensure forward and backward wireless charging capability for all mobile devices.



Qi2 Max™ Module

GPG552-15-000-C-RA

- A complete integrated module assembly: PCBA, Coil, Magnet, and Shield.
- Certified to WPC V 2.0 Standard, and granted special pre-access to certification
- Mass Production ready
- Backed by NXP, Amphenol, and NuCurrent – global leaders in the industry
- Industry-leading Power transfer efficiency
- Industry-leading thickness
- Lowest Idle Power Consumption

Applications:



Smartphones



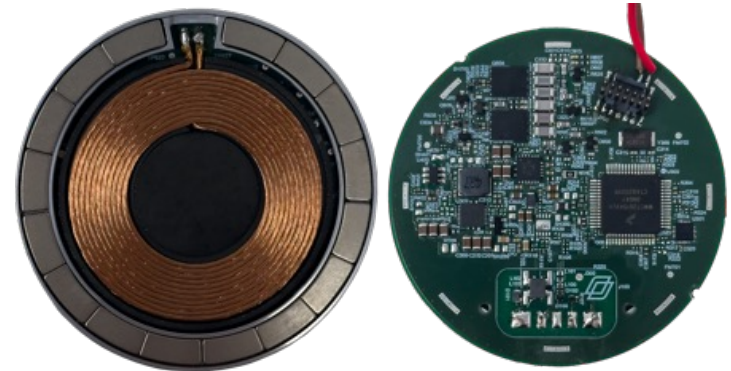
Wearable



Furniture



Infrastructure



GPG552-15-000-C-RA

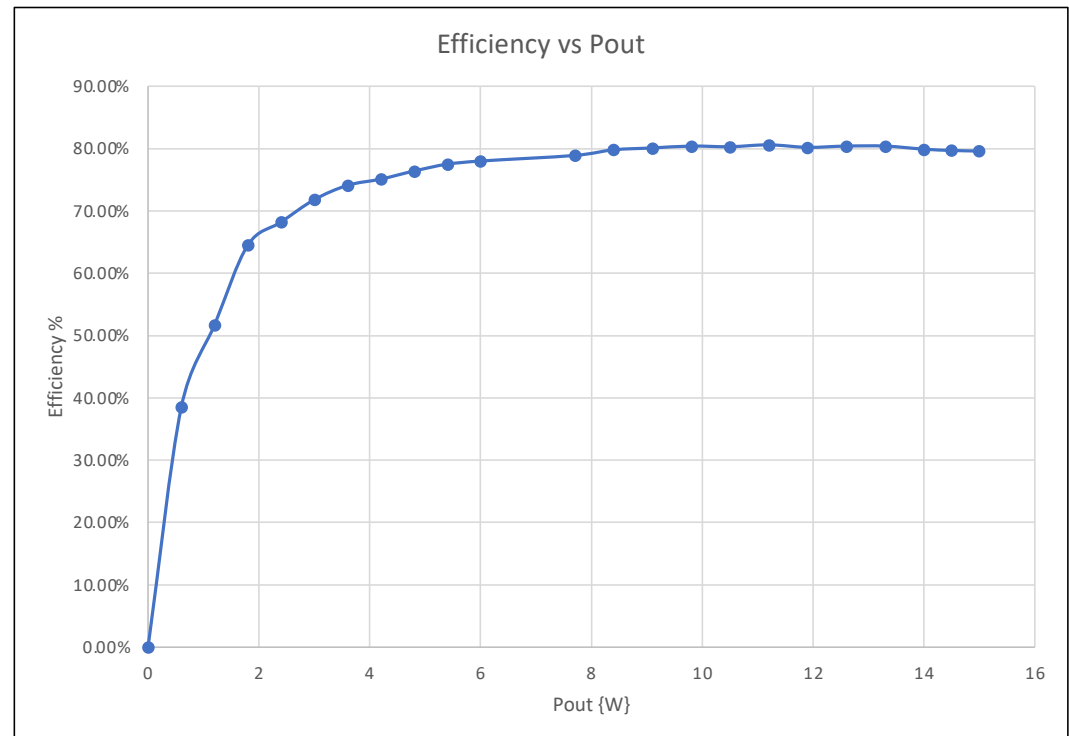
Highest Efficiency in Qi2

The Qi2 Max™ module achieves 83% efficiency achieved through our unique patented technologies and implementation. The Qi2 Max™ module currently has the highest efficiency among tested Qi2 modules in the industry.

Company	Efficiency
Qi2 Max Q401A	82.8%
Leading Competitor	77%
Competitor 1	81.7%
Competitor 2	81.5%
Competitor 3	81.0%
Competitor 4	79.6%

Industry Leading Efficiency

- Enabling CEC and energy consumption strategic objectives for our OEM partners.
- Enabling faster charging rates, especially in high ambient temperature conditions.
- **82.8% DC – DC efficiency** for 15W MPP received power using P3A Tx and MPP Rx test tool.
- 5W and 15W output achieved at all nominal and extreme coil positions



- 12.5 V was supplied to the Tx through a USB PD adaptor.
- Efficiency achieved for 15W Rx power is 82.8%.

Industry Leading Idle Power Consumption

(Data in Collection In Progress)

NuCurrent's Patented beaconing technologies allow for the lowest power consumption in standby mode allowing us to be the most sustainable Qi2 module on the market. This enables not only a lower carbon footprint, but more flexibility for companies implementing battery powered products by reducing the overall energy drain over a 24 hour cycle.

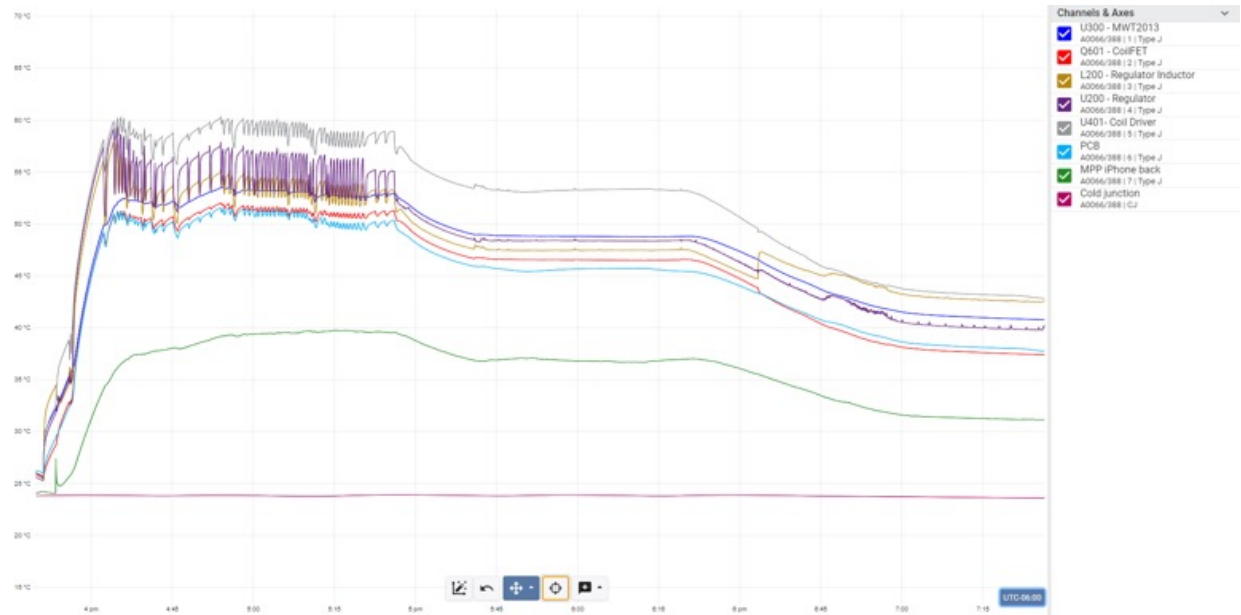
Qi2 Max passes requirements set by California Energy Commission and Department of Energy for 24hour power consumption.



Industry Leading Thermal Performance

Qi2Max iPhone MPP Thermal Test

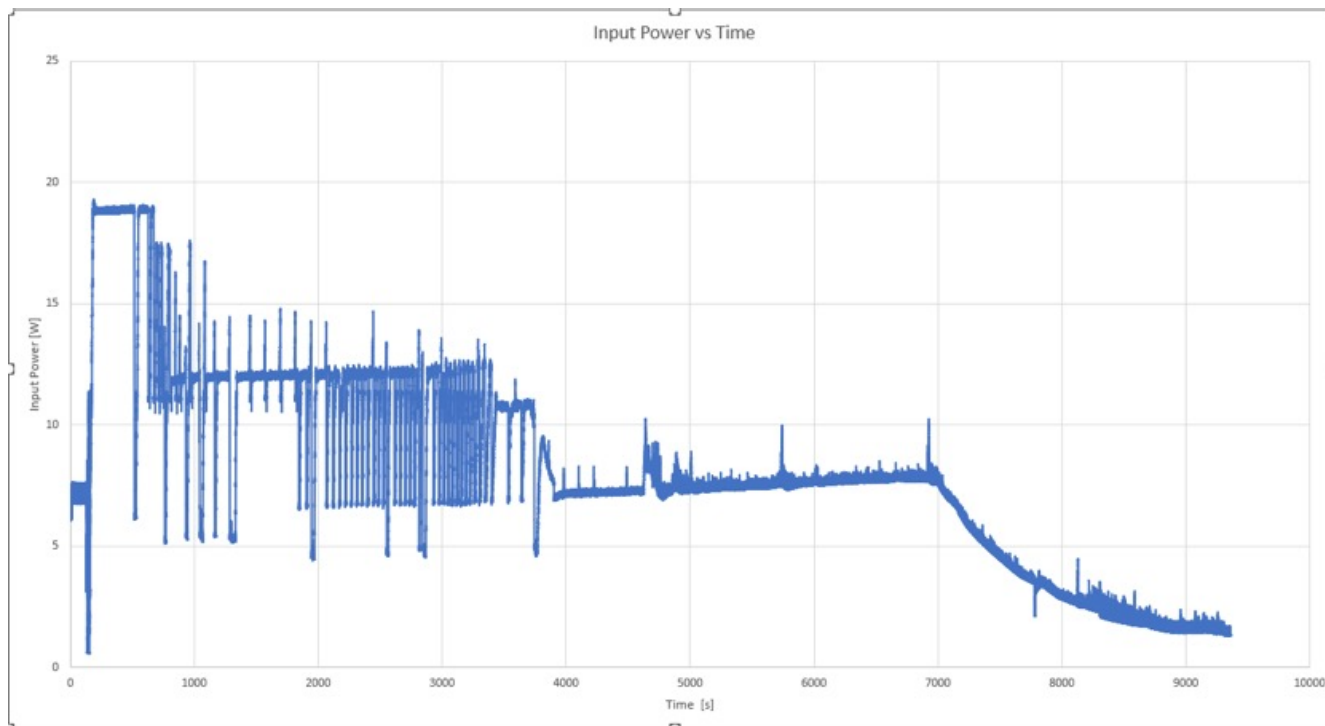
Thermal Test with 15W MPP iPhone				
Components	Initial Temp (C)	Max Temp (C)	Thermal Rise (C)	Pass / Fail
U200 - Buck Boost regulator	25.5	59.4	33.9	PASS
L200 - Buck Boost switching inductor	25.8	58	32.2	
U300 - MWCT2013	26	53.5	27.5	
U600 - Coil Driver IC	26	60.3	34.3	
Ambient	23.8	23.9	0.1	
Q601 - Coli FETs	26	52	26	
RX Surface - MPP iPhone surface	24	39.7	15.7	



- Low Temperature Rise: phone is less than 40degC
- Fastest Charge Times: Phone charges in 2:36hrs

Industry Leading Charge Time

Qi2Max iPhone MPP Charge Test



- Phone took 2 Hrs 36 min to charge completely.
- Maximum input power pulled at Tx is 19.3W.

Data Capabilities and Analytics (In Development Q1/Q2 '24)

Qi2 Max™ Powered by NuSync™, NuCurrent's intelligent power and data platform, offers OEMs predictive maintenance capabilities, insights into customer behavior, and robust performance tracking. By analyzing usage data, it aids in monitoring foot traffic, utilization rates, and security measures, allowing companies to optimize their operations and investments.

Planned Features:

- Standard Data
 - Charge Status
 - Error Status
 - HW/SW Revisions
- NuSync™ User Data Platform
 - Usage Statistics
 - Charge Duration
 - # of Unique Devices
 - Device MFG Identification



World's Thinnest Module

Qi2 Max™ is the world's thinnest module at 6.05mm, over 10% slimmer than the competition. Thanks to NuCurrent's first-in-class patented antenna technology used by big names like Samsung, it's compact and easy to integrate without changing a device's look or function

Company	Thickness
Qi2 Max Q401A	6.15mm
Leading Competitor	7.9mm

Precision Timing Control

The soul of Qi2 Max™ is NanoEdge PWM (Pulse Width Modulation) which boasts an impressive 300 picosecond accuracy. This ensures our products not only ace the WPC Certification but also shine in post deployment "in-market" checks.



- **A World-Class, Diverse Supply Chain** ensures continuity and meets flexible market demand
- A **Commitment** and focus on efficiencies and technology improvements drives lower cost

The logo for Amphenol MCP, featuring the word "Amphenol" in a large, white, sans-serif font with a registered trademark symbol (®) to its upper right. A thin yellow horizontal line is positioned below the "Amphenol" text. Below this line, the letters "MCP" are written in a smaller, white, sans-serif font.

Amphenol[®]
MCP

The text "Thank You!" is centered in the middle of the slide in a large, white, sans-serif font. The background of the slide is a futuristic cityscape at night, with numerous skyscrapers illuminated with blue and white lights. In the foreground, there are blurred, streaked lines of light in shades of blue and red, suggesting motion or data flow.