



Counterfeit iPhone adapters

A UL technical investigation shows a
99 percent failure rate

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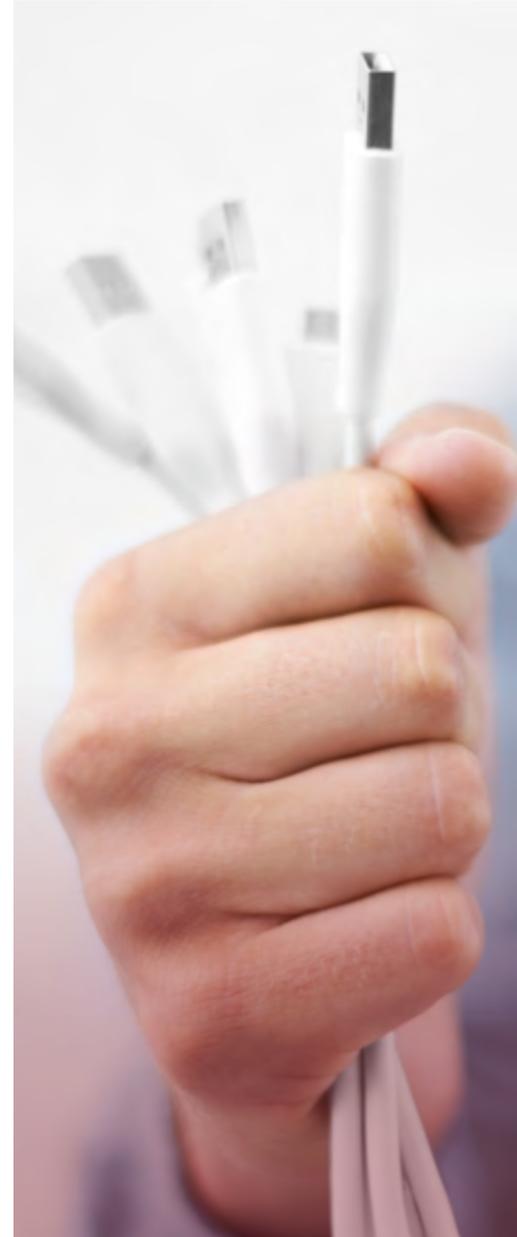
A report of the dangers of counterfeit UL marked Apple iPhone adapters

The manufacture and sale of counterfeit goods is a global problem that directly impacts legitimate producers and retailers in virtually every industry. Because it is a criminal activity, measuring the size of the counterfeiting market is inherently difficult, but one 2015 estimate puts the size of the global market in counterfeit and pirated goods at more than \$1.7 trillion (USD), up from \$600 billion in 2010¹.

A significant concern related to counterfeit electronic products and accessories is safety. In most cases, counterfeit electronic products are neither designed nor manufactured to meet industry safety standards, and lack the safety features necessary to protect users from shock and fire hazards. This problem is often exacerbated by the use of counterfeit safety marks that mislead well-intentioned buyers and consumers regarding the safety of the product they are purchasing.

As part of its ongoing effort to stem the sale of dangerous counterfeit power products, UL researchers recently conducted testing on counterfeit iPhone adapters. In total, we tested 400 adapters and the results were literally shocking. The overall failure rate exceeded 99 percent. All but three failed our basic safety tests and were fire and shock hazards. Twelve were so poorly designed and constructed that they posed a risk of lethal electrocution to the user.

This white paper will discuss the dangers of counterfeit power adapters, present the results of the adapter testing in more detail, discuss UL's efforts to combat counterfeiting and provide guidance on how consumers can recognize and avoid purchasing counterfeit adapters.



The dangers of counterfeit power adapters

An adapter is a device that is used to supply or convert power from an electrical outlet into a form that the device being powered can use. In the case of an Apple iPhone, a genuine adapter safely takes any input voltage ranging from 100 to 240 V AC and converts it to 5 V DC. So, regardless of where in the world it is used, the adapter will convert high voltage electricity from an outlet into a low voltage that safely charges the iPhone.

The design of the adapter and the materials used in its construction are critical to the adapter working safely. Reputable manufacturers and companies such as Apple devote significant resources and money to make their adapters safe and subject their adapters to rigorous testing for safety and reliability.

The market for external power adapters is a large one, with some estimates putting it at more than \$8 billion (USD) in global annual sales. Mobile phone adapters from legitimate suppliers generally retail for around \$20 USD, but counterfeit adapters are often sold for as little as a dollar, making the counterfeits attractive to a range of customers, including, consumers, retailers and to corporations for giveaways and brand promotion campaigns.

Within the past few years, several highly publicized electrocution deaths have been linked to counterfeit/infringing iPhone adapters. For example, in 2013, a man from Thailand was found dead holding his Apple iPhone plugged into a wall outlet. An investigation conducted by Thailand's National Broadcasting and Telecommunications Commission (NBTC) later concluded that the adapter was not produced by Apple and was improperly shielded or grounded². Similar concerns were reportedly identified by Australia's Department of Fair Trade in an investigation of the death of a woman in Australia, who was electrocuted as she talked on a mobile phone plugged into an adapter that had not been certified to applicable safety standards³.

The absence of a certification mark, such as a UL Mark, on a power adapter is a clear sign that the device has not been tested for compliance with applicable safety standards. However, unscrupulous suppliers are increasingly by passing required safety testing and simply applying counterfeit certification marks to their products. This practice means that even informed consumers can be fooled into purchasing counterfeit products that appear to be legitimate.



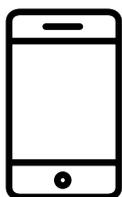
UL's testing of 400 counterfeit Apple iPhone adapters

Apple has sold more than one billion iPhones worldwide since iPhone was first introduced in 2007⁴. The sheer number of Apple iPhones in use means that there is a lucrative market for supplementary power adapters and other phone accessories. Of course, this market potential also means that there is a lucrative market for untested counterfeit copies of Apple adapters.

UL decided to scientifically assess the actual danger associated with the use of counterfeit phone adapters. In a controlled test program conducted by engineers at UL Canada, 400 counterfeit iPhone adapters with unauthorized UL certification marks were subjected to a subset of product certification testing that would most readily identify potential safety risks related to electric shock. The counterfeit adapters were obtained from multiple sources in eight different countries around the world, including the U.S., Canada, Colombia, China, Thailand and Australia.

While a multitude of tests are typically performed during a standard product certification, there are two relatively straightforward tests that can be conducted to gauge a product's safety with respect to electric shock.

An electric strength test determines how well the adapter is isolated from the electrical mains. The unit is stressed by applying high voltage between the input and the output side to see if or how much current will flow as a result. If the amount of current flowing is above a specified threshold, the unit is said to have insufficient isolation and is considered to have failed, and hence is judged unsafe with a significant potential for electric shock.



Apple has sold more than
1 BILLION
worldwide since iPhone was
first introduced in 2007⁴





With regard to the electric strength test

3/400 ▶ **99%**
Passed **Failure Rate**

Similarly, a touch current test serves to measure the amount of current that could potentially flow through a person's body when that person comes into contact with the product under examination. The adapter is supplied with its rated voltage plus a tolerance amount, and the touch current or the current that leaks through the adapter's enclosure or output cable to the iPhone or user through to ground is measured. If too much current leaks through, the unit is said to have insufficient isolation and is considered to have failed and again is assessed unsafe with risk of electrocuting the user.

The results of UL's testing of counterfeit phone adapters were literally shocking. Part of the test equipment was damaged by energizing some of the counterfeit adapters. Twenty-two samples were immediately damaged during the process of energizing or during the leakage current test with 12 samples having a very high leakage current with a capacity for electrocution.

With regard to the electric strength test, only three of the four hundred samples passed, which corresponds to a 99 percent failure rate. Selected construction reviews found issues with the isolation transformer design. The internal components are vastly different when compared with a genuine UL Listed Apple adapter. Post testing analysis of the tested samples revealed a complete lack of triple isolation wire used for the secondary windings; neither the primary or secondary windings were separated properly, which is the major reason for the dramatic failure rate on the electric strength test.



UL's ongoing efforts to combat counterfeiting

UL works closely with law enforcement to remove products bearing counterfeit UL trademarks from the stream of commerce, and to hold accountable those responsible for their manufacture and distribution. UL has assisted with hundreds of law enforcement and administrative actions related to counterfeit UL marked Apple adapters. UL enforcement efforts include Customs interdictions globally, raids at manufacturing locations as well as at retailers and wholesalers.

UL and Apple also work together globally to fight fake products, including shutting down counterfeit factories in China. These actions have resulted in the removal of hundreds of thousands of counterfeit USB adapters off the market around the world.

One recent UL investigation highlights the scope of counterfeits in the marketplace. While working with law enforcement agencies in Los Angeles, UL became aware of a distributor selling counterfeit Apple adapters. UL's investigation in cooperation with the Los Angeles Sheriff's Department led to the execution of simultaneous search warrants at the distributor's downtown Los Angeles locations. The raids resulted in the seizure of 29,000 counterfeit UL marked Apple adapters, criminal charges against the seller and an additional civil action by UL to recover the counterfeiter's profits from its crime.

Separately, working with Customs officials in Mexico, UL's seized more than 90,000 counterfeit adapters in a single shipment. Clearly, large numbers of counterfeits continue to be introduced into the marketplace.

UL has also been in the forefront of the fight against counterfeit products and safety marks worldwide. UL has assisted local, national and international law enforcement agencies, including INTERPOL, EUROPOL, the U.S. Department of Homeland Security, and other national customs bureaus and organizations in the identification and seizure of counterfeit products and in efforts to thwart counterfeiting activities. The International Intellectual Property Crime Investigators College, a joint training initiative of UL and INTERPOL, has trained thousands of law enforcement authorities and officials to recognize and identify legitimate safety certification marks.

Finally, UL works closely with its clients to develop and implement anti-counterfeiting strategies that help to stem the flow of unsafe counterfeit products and to protect the integrity of the UL Mark with buyers and consumers alike. And UL is an active vocal advocate for consumer safety, proactively surveying the market for unsafe products, alerting the public about potential product safety hazards, and correcting false and misleading claims about UL certification.

Identifying counterfeit iPhone adapters

While some counterfeit iPhone adapters can closely resemble the genuine product, there are often indicators that consumers can use to spot a fake, such as:



Color - All genuine UL certified Apple adapters are white in color.



Printed Text - Spelling mistakes, such as “Abble” instead of “Apple” or “Designed in Happy Travel” instead of “Designed by Apple in California,” as well as grammatical errors are clear indications of a counterfeit product.



Price - Genuine Apple iPhone adapters retail for approximately \$19 (USD). An unusually low price for an adapter is one of the classic indicators it might be counterfeit.



Packaging - Genuine Apple iPhone adapters sold separately come in white Apple packaging and are not sold loose in bins or other packages.

Genuine iPhone adapter

iPhone 4, iPhone 4s, iPhone 5, iPhone 5s, iPhone 6, iPhone 6 Plus, iPhone 7 and iPad mini

5W USB Power Adapter



Certification Label

<http://www.apple.com/power-adapters/>

Identifying counterfeit UL Marks

The UL Listing Marking appearing on a product typically consists of four required elements:

- UL certification mark (UL in a circle)
- “LISTED” in capital letters
- Control number or file/issue number
- Product identity

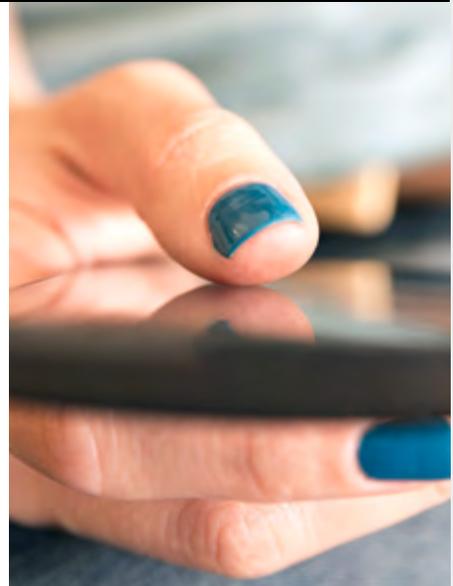


The UL Enhanced and Smart Marks were created to deliver greater clarity and acceptance in the market today. The elements of these marks consist of:

- The basic Enhanced Mark
- SAFETY attribute
- The ISO country code
- A unique identifier
- An optional QR code for the smart version



The enhanced UL Certification Mark now bundles multiple certifications into a single Mark; utilizes a unique identifier for easier access to information at UL.com/database; communicates geographic scope of certification through country codes; and describes the attributes that UL has certified about a product.



Additionally, a product name and issue/serial number or alphanumeric control number may also appear on a certified product. To contact UL regarding a concern of a UL marked product, please submit your inquiry to Report a Concern at UL.com.



Summary and conclusion

UL's recent testing of counterfeit Apple iPhone adapters reveals the significant safety risk counterfeit adapters pose to consumers. We strongly advise consumers to purchase UL certified adapters manufactured by Apple or other legitimate sources and to discontinue using any adapters without an authentic UL Mark.

Continued aggressive efforts by UL, our clients such as Apple and law enforcement authorities to police trafficking in counterfeit products are having an impact. But enforcement authorities, manufacturers, retailers and consumers all have an important role to play in reducing counterfeits and helping to prevent unsafe products from reaching the market.

For more information about counterfeiting and UL's brand protection services, contact www.UL.com/brandprotection.

Endnotes

1. “Estimating the global economic and social impacts of counterfeiting and piracy,” a report commissioned by the Business Action to Stop Counterfeiting and Piracy (BASCA), an initiative of the International Chamber of Commerce, February 2011. Web. 29 August 2016. <http://www.iccwbo.org/Advocacy-Codes-and-Rules/BASCAP/BASCAP-Research/Economic-impact/Global-Impacts-Study/>
2. “Fake iPhone charger blamed for death,” Bangkok Post, 7 March 2014. Web. 22 June 2016. <http://www.bangkokpost.com/tech/mobile/398698/inquiry-finds-iphone-user-killed-by-ungrounded-substandard-charger>.
3. “Cheap USB Charger Warning After Woman, Sheryl Aldeguer, Is Found Dead Holding Laptop in Apparent Electrocution,” The Huffington Post, United Kingdom, 27 June 2014. Web. 22 June 2016. http://www.huffingtonpost.co.uk/2014/06/27/cheap-usb-charger-warning_n_5536271.html.
4. “Apple celebrates one billion iPhones”, Web. July 27, 2016. <http://www.apple.com/newsroom/2016/07/apple-celebrates-one-billion-iphones.html>



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