

SquareTrade Research: iPhone More Reliable than BlackBerry, One Year In

An Analysis of Reported Malfunctions in iPhone, BlackBerry and Treo Handsets.

Synopsis: SquareTrade analyzed cell phone failure rates for more than 15,000 new phones covered by SquareTrade Care Plans and found iPhone handsets had substantially fewer failures than BlackBerry and Treo handsets within the first year of ownership.

Highlights of the study include:

- *In the first year of ownership, the iPhone had a 5.6% malfunction rate, half the rate of the BlackBerry and one-third the rate of the Treo.*
- *The iPhone is projected to have a 9-11% malfunction rate in the first 2 years of ownership, compared to 14.3% for BlackBerry and 21% for Treo handsets.*
- *Touch-screen issues were the most frequently reported iPhone problem, accounting for nearly one-third of all reported malfunctions.*
- *The iPhone is prone to failure due to accidental damage, with 33% more failures reported in the first year. Nearly one quarter of iPhone handsets are projected to fail due to an accident in the first two years of ownership.*

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Introduction: Comparing the iPhone 3G with its peers

Apple 's 2008 fourth quarter results showed 6.9 million iPhone 3G handsets sold. That number – higher than the 6.1 million total 2.5G handsets sold in the previous 5 quarters – puts total iPhone sales well on track to exceed Steve Job's stated goal of selling 10 million 3G units this year. Apple's extraordinary success with the iPhone has not come without complaints and skepticism. Shortly after both the 2.5G and 3G launches, hundreds of users expressed grievances with the iPhone in online forums and blogs, with abundant reports of users plagued by hardware and software problems.ⁱ

In this study, we attempt to quantify some of these reported iPhone problems, and compare the iPhone failure rate with two other popular lines of "smart phone" – the RIM BlackBerry and the Palm Treo. We also hope to shine some light on the types of problems frequently reported in online forums.

This analysis examines customer reported data on over 15,000 phones in the past 2 years.ⁱⁱ We tracked failures due to accidental damage separately from malfunctions through normal usage ("malfunctions"). For the purposes of this study, we have focused primarily on malfunctions to evaluate the manufactured quality of the handset models.

After the first year of handset use, we found a 5.6% malfunction rate reported on iPhone handsets, significantly lower than BlackBerry and Treo handsets. We project the iPhone will have fewer malfunctions over the 2 year minimum lifetime of a phone – the length of most wireless carrier contracts. Finally, we took a look at the different problem types reported for the iPhone, such as call quality and touch screen issues.

iPhones: One year in.

First, we examined failure rates at the one year mark. The principal, constraining reason for doing so is that the iPhone was less than 15 months old at the time this study was conducted. A secondary reason is that the one year mark signals the end of the one year manufacturer warranty. This serves as a point of reference for problems that may have been covered within that warranty period.

Figure 1. Handset failure rates after 1 year of ownership.

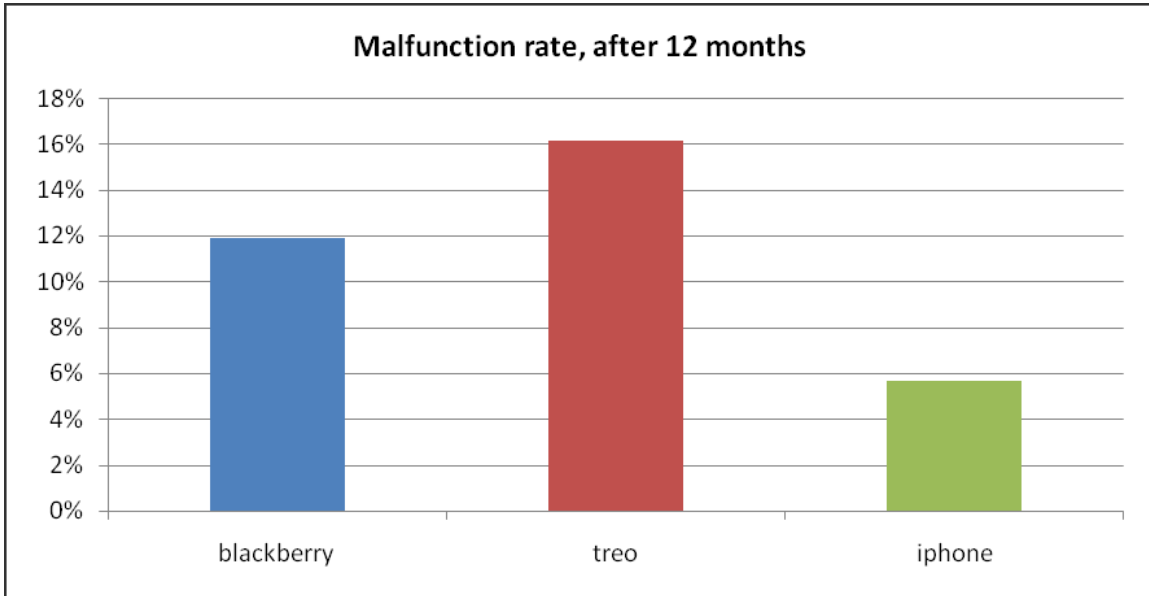


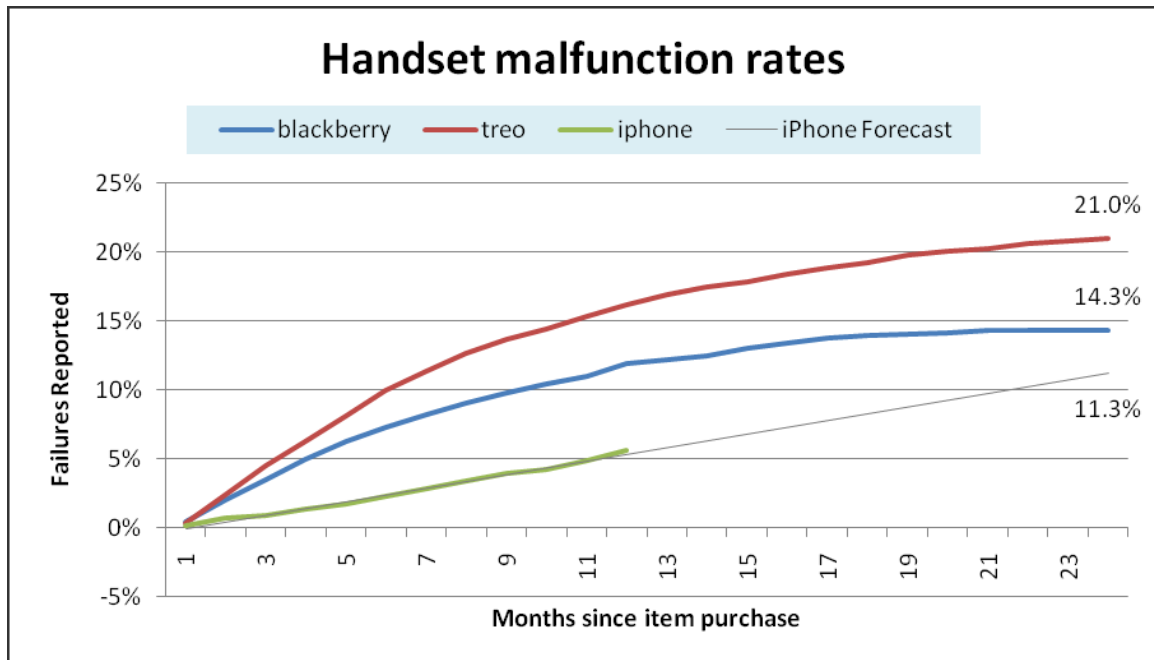
Figure 1 shows the relative malfunction rates reported after the first twelve months of ownership. iPhones are the least likely to malfunction, with 5.6% of handsets reporting a malfunction within the first year. This is less than half the reported rate of BlackBerry handsets at 11.9%. Owners of Treo handsets reported the highest rate of the three, with 16.2% having a malfunction within the first 12 months of ownership.

Projected malfunction rates over 2 years.

For most cell phone users, their greatest vulnerability to replacement costs occurs during the second year of ownership. During this period, the initial one-year manufacturer's warranty has expired, and the customer is mostly ineligible for the heavily subsidized newer models.

To determine the likelihood of iPhone replacement during this period, we first forecasted the malfunction rates at the 24-month mark. In Figure 2, we apply a straight line forecast to the first 12 months of iPhone data. The BlackBerry and Treo data shown is actual data at the 24-month mark.

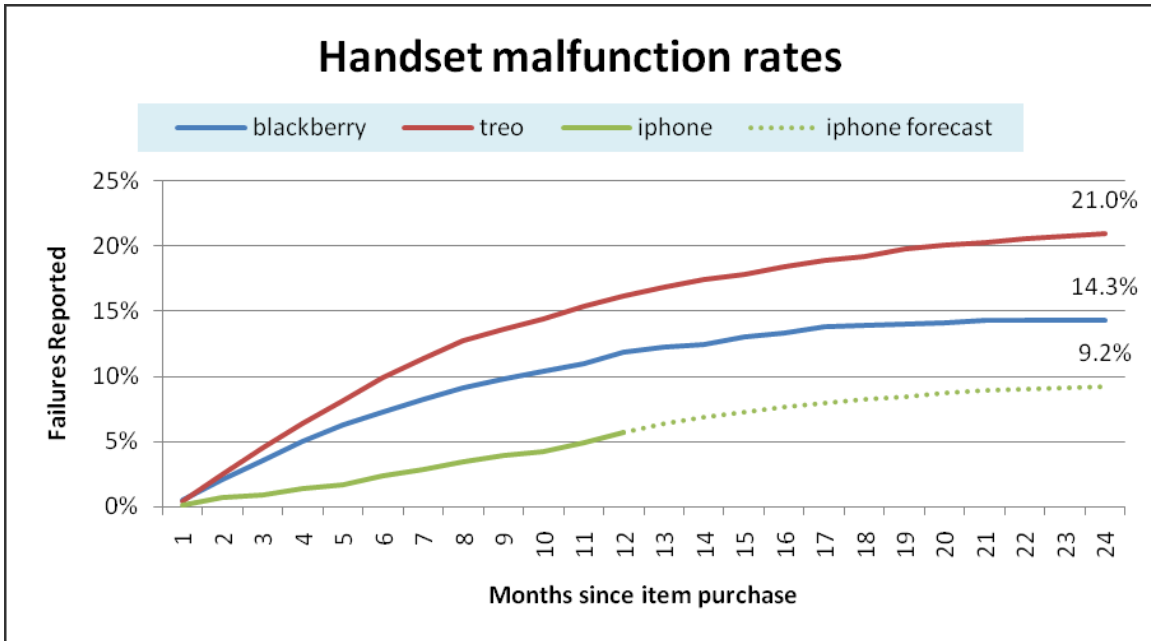
Figure 2. Projected iPhone malfunction rate after 24 months, straight-line model.



Under this straight-line scenario, which assumes that reports of iPhone malfunction continue at the same pace over the first 12 months, it would result in a failure rate of 11.3% after 24 months – a 5.6% malfunction rate during the second year of ownership. This model projects a higher second year failure rate for iPhones than both BlackBerry and Treo, which show 2.4% and 4.8% second year failure rates, respectively.

However, our data models for other electronics show that reported failure rate curves exhibiting asymptotic behavior, with a curve that eventually flattens out in the 12-24 month time frame. This curve varies depending on the product type, manufacturer, and model. Using a moderately conservative asymptotic forecast for iPhone malfunction rates, we estimate a 9.2% failure rate after 24 months:

Figure 3. Projected iPhone malfunctions after 24 months, asymptotic model.



The asymptotic model in Figure 3 projects an iPhone malfunction rate of 3.6% during the second year, halfway between that of the BlackBerry and Treo.

Without more data, it's impossible to definitively know if iPhone owners are at a bigger risk for handset malfunction than BlackBerry and Treo owners after the manufacturer's warranty has elapsed. Regardless, both models forecast iPhones with a significantly lower failure rate at the end of 24 months of ownership. From this analysis, we can infer that iPhones are more reliable handsets than the other two smart phone models.

Problem types – complaints versus reality.

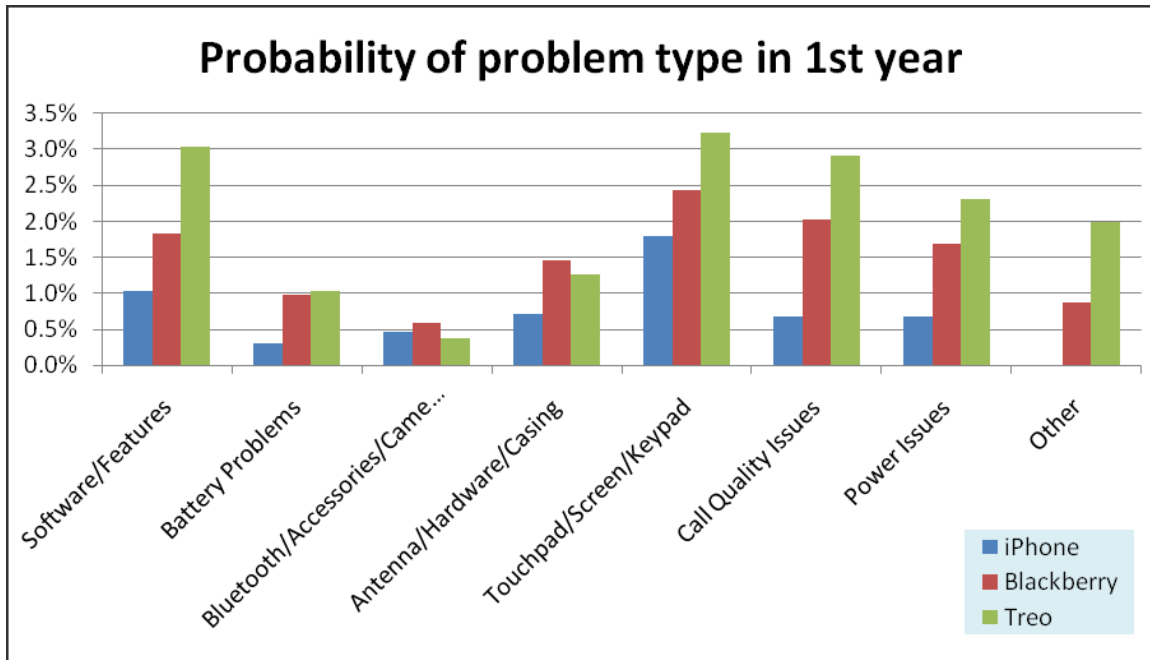
We next turn our attention to evaluating the failure rates of specific handset features. Modern day mobile phones have a dizzying array of electronic and mechanical components. GPS, wi-fi, and high-resolution cameras are fairly pedestrian features these days. The iPhone goes further, sporting cutting edge technology like a mutual capacitance touch-screen and an accelerometer (like the Nintendo Wii controller).

We divided reported malfunctions into the following problem categories:

- **Software / Features.** Includes operating system lockups, frozen applications, voice recognition software, etc.
- **Battery Problems.** Primarily batteries that fail to hold a charge.
- **Bluetooth / Camera / Accessories.** Includes functional components that are part of the handset.
- **Antenna / Hardware / Casing.** Includes all physical integrity issues.
- **Screen / Keypad / Touchpad.** Includes burn-in, screen spots, dead pixels, and touch screen dead spots.
- **Call Issues.** Includes outbound calling, call reception, poor call quality, dropped calls and microphone issues.
- **Power Issues.** Includes power connectors, powering on/off, and inability to stay on.
- **Other.** Other issues, not categorized above.

First, we look at the frequency of malfunctions reported within the first year of ownership. Adding up the individual failure probabilities gives us the aggregate rates given in Figure 1, so it's no surprise that the iPhone shows the least failures of any individual type.

Figure 4. Probability of problem type in 1st year.

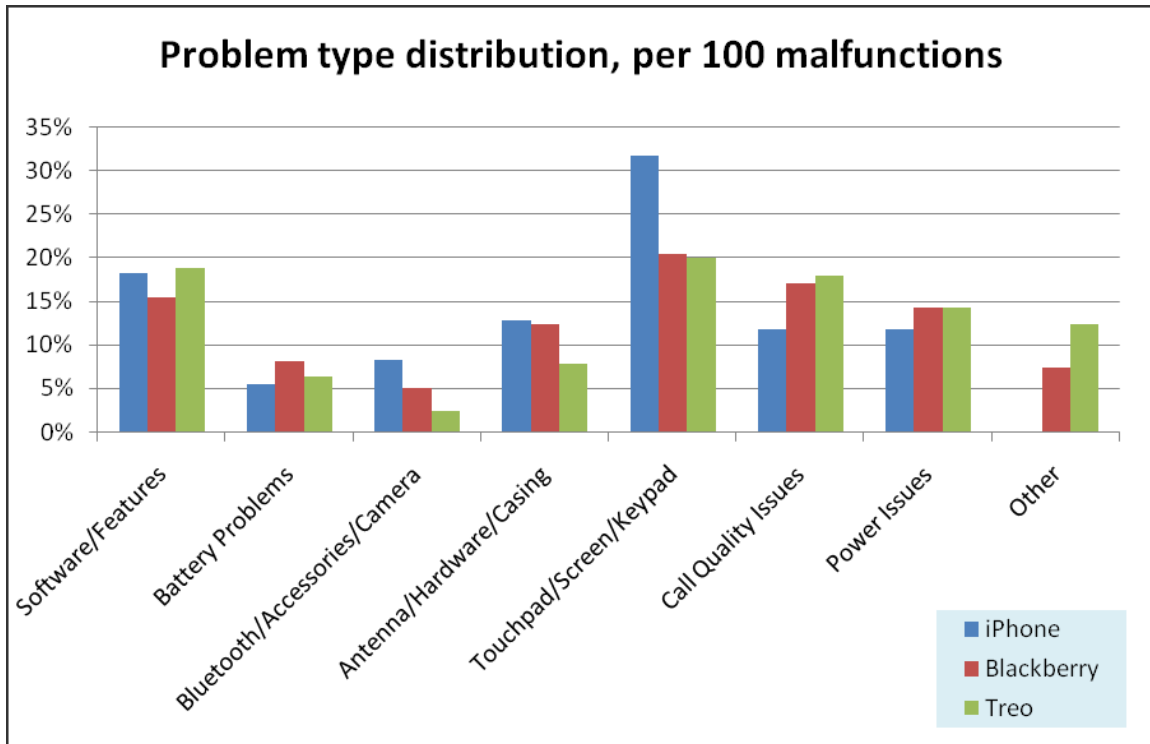


There has been much discussion about the iPhone battery and the cost to replace it, including a recently dismissed lawsuit filed against Apple accusing them of Consumer Fraud.ⁱⁱⁱ At the one year mark, such fears appear to be largely unfounded, with fewer than half of a percent of users reporting a battery problem. This compares to roughly 1% of BlackBerry and Treo handsets reporting battery issues during the same time period.

Online forums have also been flooded by complaints made about the call quality of 3G iPhones, including another lawsuit filed in Alabama.^{iv} While we lack sufficient data to assess the difference in call quality issues between the iPhone 3G and the 2.5G, the 2.5G model seems to be relatively trouble free. This is especially true given that call quality is a major issue for both BlackBerry and Treo; both handset lines have over 2% reporting a call quality issue within the first year.

The most significant malfunction types for iPhone handsets is the touch screen. Figure 5 shows the disproportionate number of touch screen malfunctions – one third of all reported iPhone problems were screen-related.

Figure 5. Probability of problem types, by phone model.



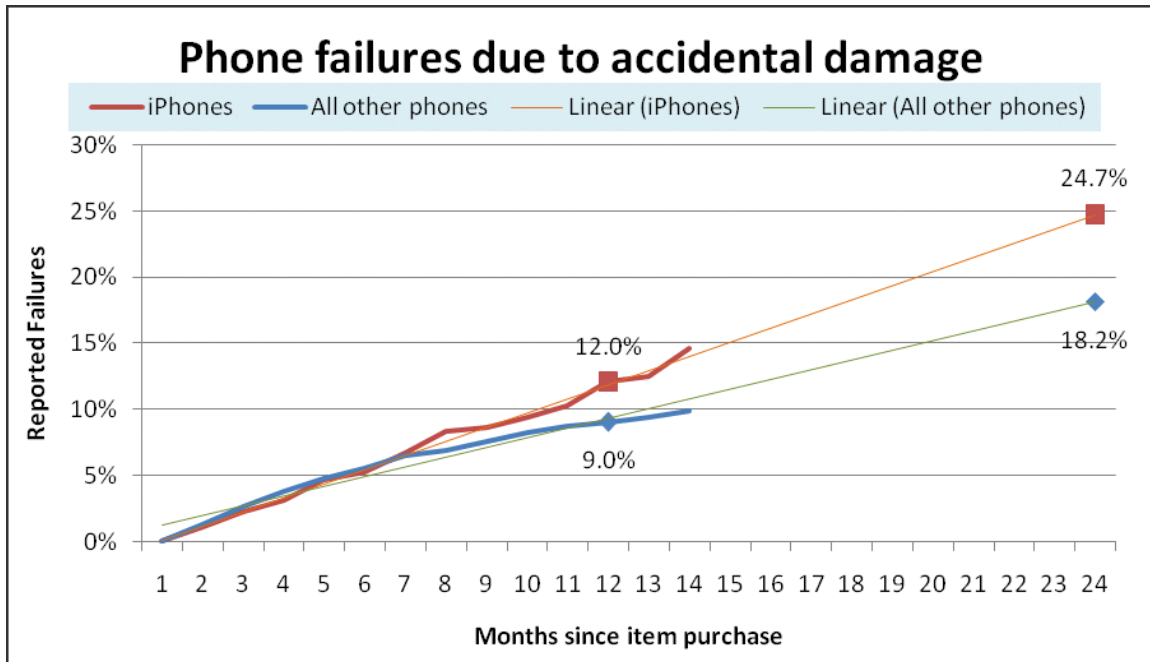
Looking further, the majority of these reported issues were “dead spots” found in some touch screens of the original iPhone 2.5G. This was an issue Apple proactively addressed under the terms of their manufacturer’s warranty quickly after the issue arose.^v While the “dead spots” problem that made headlines in 2007 doesn’t appear to affect the 3G screens, our limited data suggests that touch screens continue to be the biggest source of problems in the iPhone 3G.

Accidental Damage Prone: iPhones are slippery!

In this analysis thus far, we’ve focused primarily on failures caused by handset product defects that have arisen from normal use. While this is useful for determining the relative reliability of the iPhone versus its competitors, it doesn’t tell us the whole story about the likelihood of a phone failing on a user. To do that, we have to look at malfunctions caused by accidental damage as well.

As it turns out, an iPhone user is more than twice as likely to experience an iPhone failure due to accidental damage than through a handset malfunction. An astounding 12% of iPhone owners have reported a failure due to accidental damage at the 1 year mark, and nearly a quarter of all iPhone owners can be expected to have their phone fail from an accident by the end of 2 years. This accident rate is higher than the 9% accident rate reported on all other phones by one-third, as shown in Figure 6^{vi}:

Figure 6. Accidental Damage Rate, iPhones



It's likely that any iPhone owner can guess the reason that iPhone accidents are so common. After 2 minutes of handling an iPhone, it's impossible to escape noticing that the handsets are incredibly slippery. The form doesn't help, either. The dimensions make for a difficult grip, especially for those with small hands. These two factors conspire to make the iPhone more accident prone than just about any other handset model we've seen.

Conclusions and Areas for Future Research

One year in, the data suggests that Apple's first foray into the cell phone handset market has not been plagued by hardware problems, as some early reports suggested. Aside from exhibiting a relatively high rate of touch screen failures, iPhones have not had significantly high malfunction rates in any of the areas we identified.

However, the data also warrants closely monitoring iPhone failures during the second year of ownership. If the reported malfunction rate continues to trend in a straight line, it may indicate higher out-of-warranty failure rates for iPhones than other handsets.

Another area for future investigation will be to see if the iPhone 3G exhibits a different problem profile from the 2.5G. The data looks comparable at the 2 month mark, but we will hold out for further data before drawing any conclusions. Likewise, there may be significant differences in the failure rate of BlackBerry models that are not explored in the scope of this paper.

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Appendix A: Notes About the Data and Methodology Used

SquareTrade randomly selected 6,678 BlackBerry, 5,651 Treo, and 4,902 iPhone handsets covered by SquareTrade Care Plans between October 2006 and October 2008 for this study. We included all handsets marketed under the iPhone, Treo, and BlackBerry names and purchased brand new (i.e. not refurbished or used).

The following disclaimers apply to our data and analysis:

- Only malfunctions reported directly to SquareTrade are included in the data. Other malfunctions, including software issues handled directly by the retailer, problems associated with product recalls, and those fixed by software/firmware updates, may not be represented in this data.
- We did not take into consideration purchase location, network purchased for, or if the phone was unlocked at the time of purchase. Other reports have shown that these factors can contribute substantially to the incidence of problems, especially with Call Quality issues.

SquareTrade has made efforts to ensure that the data we present is correct. SquareTrade makes no warranty, express or implied, about the accuracy of the data. SquareTrade is an independent third party, and has no affiliation with any of the handset manufacturers cited in this study. Users of the information in this document acknowledge that SquareTrade cannot be held liable for any damages whatsoever to any individual, organization, company, industry group or representative arising from the use of this data.

ⁱ “Apple Faces growing list of problems with iPhone.” MarketWatch. Aug 14, 2008.
<http://www.marketwatch.com/news/story/apple-faces-growing-list-problems/story.aspx?guid={436A8B0D-369A-4035-8AD2-68BD27DC7E82}>

ⁱⁱ The data used for this study comes from customer-reported handset failures from customers who have purchased SquareTrade Care Plans on new cell phones. The reported failures include both warranty claims and other malfunctions reported to SquareTrade. Some failures, particularly software, are dealt with directly by the retailer and/or manufacturer and may not be reflected in SquareTrade’s data.

ⁱⁱⁱ “Court dismisses iPhone battery lawsuit.” MacNN website. Sep 8, 2008.
<http://www.macnn.com/articles/08/09/26/iphone.battery.suit.nixed/>

^{iv} “Apple files to dismiss iPhone dropped call suit.” MacNN website. Oct 13, 2008.
<http://www.macnn.com/articles/08/10/13/apple.files.suit.dismissal/>

^v “Apple addressing dead spots on iPhone touchscreens.” AppleInsider website. Aug 9, 2008.
http://www.appleinsider.com/articles/07/08/09/apple_addressing_dead_spots_on_iphone_touchscreens.html

^{vi} “All other phones” shows reported failures from accidental damage for all cell phone models, excluding iPhones, starting in July 2007; sample size = 3987.