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Improving Smartphone Durability by Reducing the Impact of Liquid Damages (Part II)

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Liquid damage is the second-largest cause of damaged smartphones. IDC estimates that nearly 900,000 smartphones are damaged by liquids every day. The impact of liquids on smartphones is estimated to be worth in excess of $96.7 billion a year.

Over the next four years, cumulative shipments of smartphones will surpass 6.4 billion units, representing $1.5 trillion. Manufacturers should provide solutions that prevent smartphones being damaged when in contact with liquids due to occasional accidents. This will improve customer satisfaction and brand loyalty.

But Does Liquid Protection Sell?

Liquid protection is not usually mentioned as one of the key purchasing drivers for smartphones. However, it is a feature that end users value when an accident occurs. It is associated with the quality and durability of the device, and it is something users have come to expect.

IDC's *ConsumerScape 360 Survey* found that the top 3 purchase drivers for smartphones, consistent among the major brands, are:

1. a) Battery life (77%)
2. b) Quality/durability (77%)
3. c) Ease of use (71%)

Providing a solution to prevent damage from liquids is a strategic decision that all OEMs will have to embrace and carriers will require. OEMs should move from a myopic view of saving costs on R&D and implementation to a wider view that increases brand loyalty and prevents revenue losses from dissatisfied customers while reducing the high costs associated with repairs. In mature industries, such as the mobile phone industry, players look for alternatives to differentiate their offerings from those of their competitors. Offering liquid protection would give them an edge, and IDC believes that most OEMs will offer a solution to this problem — a problem that is no longer acceptable.

IDC conducted a number of interviews with OEMs for this research and learnt that the level of interest in liquid protection among OEMs is growing fast. This is driven by the need for differentiation, the increasing pressure from carriers to reduce costs and the prospect that other brands will offer liquid protection in the future. Since Apple announced the iPhone 7 offering water resistance, the level of interest from OEMs here has increased.

"Water-resistant handsets are the fastest-growing segment in the smartphone category"

Nano-coating technology and liquid protection will help improve user experience and differentiation in such a crowded market. In 2014 only 4% (217 models) of new smartphones offered water resistance. In 2016 that number increased to 7% (476 models). The total number of devices shipped featuring water resistance increased 76% year on year in the first nine months of 2016 compared with the previous year. Water-resistant handsets are the fastest-growing segment in the smartphone category. Non-water-resistant smartphones have declined 7% in the same period.

Solutions to Prevent Liquid Damage

There are two main ways to protect smartphones against liquid damage:

- Physical seals: by using seals and gaskets, manufacturers can create a physical barrier that prevents liquid ingress.
- Nano-coating technologies: a hydrophobic coating can prevent ingress or corrosion by acting as a barrier to prevent liquids coming into contact with the treated component.

Physical Seals

Physical seals provide strong protection against liquid ingress. The seals and gaskets are used to protect all potential ingress points. Small covers are also used in those areas that need to be accessed such as the charger port, the headset jack, the SIM card and SD card trays. This provides a high level of protection against liquids and dust.

Although a robust solution, there are a few problems with physical seals:

- The complexity of the phone design is exponentially greater than with a phone designed without the physical seals, so the cost and time needed to design and manufacture the phone are exponentially higher.
- The covers need to be closed at all times to prevent liquid ingress when the phone is dropped into a liquid.
- The seals and gaskets can move and can let liquids into the phone if it bends or is dropped.
- The physical protection impacts the thinness of the phone.

Nano-Coating Technologies

There are three types of nano-coating technologies: hydrophobic, atomic layer deposition and multilayer films. When the wetting angle is more than 90 degrees, it is typically defined as hydrophobic. This creates a more resistant barrier than with standard coatings and allows mass-scale application. The process delivers an ultra-thin hydrophobic nano-coating which provides high levels of repellency. When liquids come into contact with the coating, they simply roll off due to the low surface energy created by the coating. This results in a coating that does not affect the look and feel of a product, a major issue for most manufacturers looking into these solutions. The hydrophobic technology can be applied to the device without negatively impacting the electrical circuitry or delicate components such as the microphone, radio antennae or speaker.

Though it requires extra product testing to make sure each component works perfectly with the coating on, it is far less expensive and more efficient than physical seals when a full waterproof solution is not required.

For most users, damaging a phone can be stressful as it can potentially be very expensive to replace the device. Most phones are damaged accidentally and not because they have been used in rugged environments. Users want products that can handle the occasional accident and not necessarily a high level of protection for tough environments, which they can get by buying a ruggedized device.

Nano-coating technologies can significantly reduce the impact of liquid exposure from occasional accidents, without significantly increasing the price of the device. This is a technology that, in combination with a better industrial design, can provide high levels of protection. OEMs should offer liquid protection on their devices by using nano-coating technologies — it is an inexpensive solution and the return on investment for manufacturers is attractive, as our research demonstrates.

This is a strategic decision that all brands should take to keep customers loyal and to drive the business.

If you want to learn more about this topic, or are interested in European Consumer Wireless and Mobile Communications, please contact **Francisco Jeronimo**.

(Read here Part I)

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