

Smart Meter Interference



4-60 kHz

Radio frequency interference can be created by the Switched-Mode Power Supply (SMPS) units in Smart Meters even when their wireless transmitters are disabled unless suitable precautions are taken. This interference, or 'dirty electricity' as some call it, can be carried indoors from the SMPS onto mains wiring.

"Extensive measurements have demonstrated that all of the meters measured so far, including ABB, GE, and Landis Gyr, emit noise on the customer's electric wiring in the form of high frequency voltage spikes, typically with an amplitude of 2 volts, but a frequency anywhere from 4,000 Hertz, up to 60,000 Hz. The actual frequency of the phenomena is influenced by the devices that are plugged into the customer's power. Some houses are much worse than others, and this observation has been confirmed by PG&E installers that have talked to us," - quote by engineer (Brangan & Heddle 2011a).

Refer also to the section on 'PLC, Switched-Mode Power Supply and Health'.

900-928 MHz

California, USA

The emissions from PG&E's wireless electric Smart Meters (which operate in the 902-928 MHz range – *which is unlicensed in North America*) have been implicated as interfering with: baby monitors, remote car starters, cordless phones, DirecTV systems, garage door openers, motion detectors, patio speakers, wireless headphones, wireless microphones and security systems – *even in the middle of the night.*

Such problems were first noted in 2009, and can occur when the Smart Meters transmit information wirelessly back to the utility (OTLB 2011, Rockstroh 2010).

Ontario, Canada

In Ontario, the utility company Chatham-Kent Hydro has installed wireless Smart Meters that operate over the same frequency range (902-928 MHz) used by PG&E.

The choice to use these unlicensed frequencies appears to have been taken as a cost saving measure in an attempt to benefit their customers who had to fund the rollout.

It is, however, now being claimed that the money originally saved by this decision (*the project was coming in at a third of the cost of those by other utilities*) could be lost as a result of severe concerns related to technical aspects of the rollout – namely that the units cause illegal interference on the bandwidths used.

In order for the wireless Smart meters to qualify for licence-exempt use in that frequency range, their transmission power must not exceed 50 mV/m at a distance of (9 feet 10 inches) 3 metres (corresponding to a 0.00075 watts output power). As noted by C-K ARC (2010), as the Smart Meters transmit at significantly higher power levels (0.5 watts of RF/microwave energy), they have to operate using a frequency-hopping scheme under Annex 8 of RSS-210 - which unfortunately causes interference with other devices.

“... it is ILLEGAL to cause this interference in the first place. Industry Canada requires all equipment operating under RSS-210 to cause no interference to other users, including licence-exempt users,” C-K ARC (2010).

Though Industry Canada does not get involved with cases of interference, this is still a matter of law enforceable in Civil Courts and a matter of concern to those in the Smart Meter industry.

Businesses or individuals who have their investment in wireless equipment rendered useless as a result of permanent interference have recourse to legal action, with the likelihood that, due to the large number of parties affected *“a group of cases could be certified for Class Action,”* (C-K ARC 2010).

The EMF Safety Network online survey (SDA 2011) indicated that 8% of respondents had experienced burned out appliances or damaged electronics after installation of Smart Meters.

References

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The general adoption of fibre-optic systems may provide a simple solution to reduce risk of bandwidth interference and a number of possible legal actions.

Electrical safety and Smart Meters



Image source: Kaskurgichan (2011).

There have been a number of reports of Smart Meters exploding, catching fire, overheating, smoking or smouldering due to poor installation (Admin 2011, Clark 2010, CBS 2010, CPC 2011, Davis 2011, HMH 2011, MrHillDo 2011). It appears vital that properly trained electricians are employed to undertake installations.

“As soon as he pulled the meter we could see what had happened. The receiving clips for the meter were burnt. ... [The utility service worker] then said “... you’re lucky it didn’t start a fire.”

... He then proceeded to tell me that they were having nothing but problems with the contractor who was installing the meters ...

He then went on, telling me that the burnt area was more than likely due to the contractors not being able to fit the new Smartmeter into place, so they widened the receiving clip and shoved it into place. By them widening the clips, they caused an area of no contact which then caused arcing every time we used any appliance with 220v.” Captain Ross, California Fire Department (Admin 2011).

Electrical hazards and fire risks

There have been a number of incidents of electrical hazards and fire risks reported worldwide related to Smart Meter installations both outside and inside buildings. A selection of these is presented.

The above photograph “is the aftermath of one of those new smart meters not being properly installed. The guy who installed it did not know what he was doing and caused the main electric line to the box to become loose and over time it ended up touching the electric meter/box casing causing a fire and a huge firework festival on the side of our house. If I was not home we would have lost the house and our 3 dogs. ...” Kaskurgichan (2011).

Florida, USA

A claim has been made by a Florida woman that a brand new Smart Meter “*caught fire and caused [excess] current to pass thru my house and fry my beautiful new kitchen.*” \$31,993 of damage was caused to appliances and electronic devices in the home which had also recently been rewired.

It is being contested whether the utility company is liable for the damage as “*the Florida legislature has given FPL special protection by declaring that they do not have to pay for damage caused by their negligent mistakes. Only gross negligence and this is done to keep FPL's costs down so they can keep everyone's power bills from going up.*” Howard Finkelstein (HMH 2011).

The following comments were posted online about that incident: (Boater39) “... we had a fire last week ... Afterwards, I went to investigate and it was the electric meter that burned up. ... I have an electrical background, and from my professional experience, whatever caused the meter to burn up was a dead short carrying a very large amount of current. Based on the damage, the problem was AT THE METER – not at the customer equipment attached to the meter. (like I said, I have professional experience). At the time I found it strange, until I saw this report on TV....” (HMH 2011).

Texas, USA

There have been a number of complaints about outages and house fires related to Smart Meter installations in Texas (Carey 2011, CPC 2011, CBS 2010). One of these is detailed below:

“Charles Phillips saw smoke coming from the transformer in his backyard ... When he went out to ... he saw a [utility] contractor at his meter box with a fire extinguisher.

“He told me it had caught on fire,” Phillips said. “He had talked to his boss. Evidently, he told him to put it out, which is what he did.” But that was just the beginning. Inside Phillip's home, two TVs were fried, his air conditioner and garage door opener stopped working, and all of the wires and cables hooked up to his electronics were melted from the jolt his electronics took when a fire sparked after the installer removed his old meter. Phillips was left with a total of about \$2,500 in damages.” (Davis 2011).

“‘I felt that they should have some type of liability,’ said Phillips about CenterPoint Energy. But both CenterPoint and the subcontractor installing the smart meters across Houston said the damage is not their fault or their responsibility.’ (Davis 2011).

The utility stated that such *problems exist predominantly in older homes where the wiring is incorrect or a strain has been put on the wiring running into the Smart Meter enclosure.*

Christchurch, New Zealand

A spate of meter fires occurred in Christchurch in 2010 with, in one instance, firefighters being called out to three Smart Meter malfunctions within five days.

In one case a consumer woke up at 4.30 in the morning to find his Smart Meter on fire, the following day a registered electrician who lived in the same area pulled into his driveway to find his meter box on fire and emitting copious amounts of smoke.

Station Officer Murray Jamieson of the NZ Fire Service stated, "*It was very dangerous, ... the whole thing burnt out completely, last night's one was a melt down and it was significantly dangerous,*" (Clark 2010).

Possible causes

Bad fitting - there is not likely to be a significant increase in current indoors from Smart Meters unless they are badly fitted.

There is the possibility that the extra current generated through fitting errors may cause the live/'hot' wires in the building to carry more current than they were designed to, which can cause overheating. This in turn can also overload the 'neutral' wiring (*particularly if it is thinner than the live/'hot' wiring as is often the case in North America*).

This situation may result in damage to appliances and items of electrical equipment and create potential fire hazards - *the greater the current carried the greater the danger, particularly with older wiring.*

The degree of risk of damage to electrical items and fires varies from country to country depending on building codes and also from building to building (depending on how and when it was wired).

In North America, risk of damage from these greater currents can often be exacerbated as a result of neutral wires often being sized smaller than hot/live wires (Spitaels 2011).

Best practice

Arc-fault circuit interrupters (AFCI) are circuit breakers designed to prevent fires by detecting non-intentional electrical arcs and

disconnecting the power supply before the arcing starts a fire. They are required in US building codes for new build construction and renovation work.

Ground Fault Interrupters (GFI) - or *Residual Current Devices (RCD)* as they are known in the UK - are circuit breakers that protect from individuals from electrical shock by interrupting a household circuit when there is a difference in the currents in the hot/live wire and the neutral wire.

Wireless Smart Meters have been shown to trip both AFCI and GFI/RCD (Admin 2011, Rockstroh 2010).

Building wiring

Powercor in Australia acknowledges the safety risks related to wiring stating, *"A defect notice is issued when a wiring safety issue is identified. The defect may be identified before or during the smart meter installation or during the testing that we must do before reconnecting the electricity supply. If you are given a defect notice, you will need a registered electrical contractor to rectify the defect and issue a Certificate of Electrical Safety"* (SMFE 2011).

As a matter of best practice, neutral wires should never be undersized in buildings where high levels of harmonics and radiofrequencies (as can be caused accidentally by some Smart Meters) are likely to be carried on wiring.

As noted by Spitaels (2011), *"In modern facilities the neutral wiring should always be specified to be the same capacity as the power wiring (or larger). This is in contrast the electrical codes which may permit undersizing the neutral wire."* [Emphasis added by present author].

Safety certification

Underwriters Laboratories Inc. (UL) deals with matters of product safety and undertakes certification of Smart Meters worldwide. In February 2011, the Capitola City Council in California discovered that wireless Smart Meters being installed there did not have the UL certification required under the state electrical code for all domestic electrical equipment and appliances (OTLB 2011).

Such matters need to be addressed, as ensuring the safety of 'smart' technology is paramount both for reasons of public safety and consumer confidence - certification, such as that already undertaken by Underwriters Laboratories Inc. (UL) appears essential.

SMART METERS - SMARTER PRACTICES

In addition to UL certification being available for Smart Meters, there is now certification issued under the authority of the US FCC that requires that all persons be kept at least 8 inches (20cm) from wireless Smart Meters (CCS 2011). The more rigorous exposure guidelines of some other countries, such as Russia and China, would require far greater distances.

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