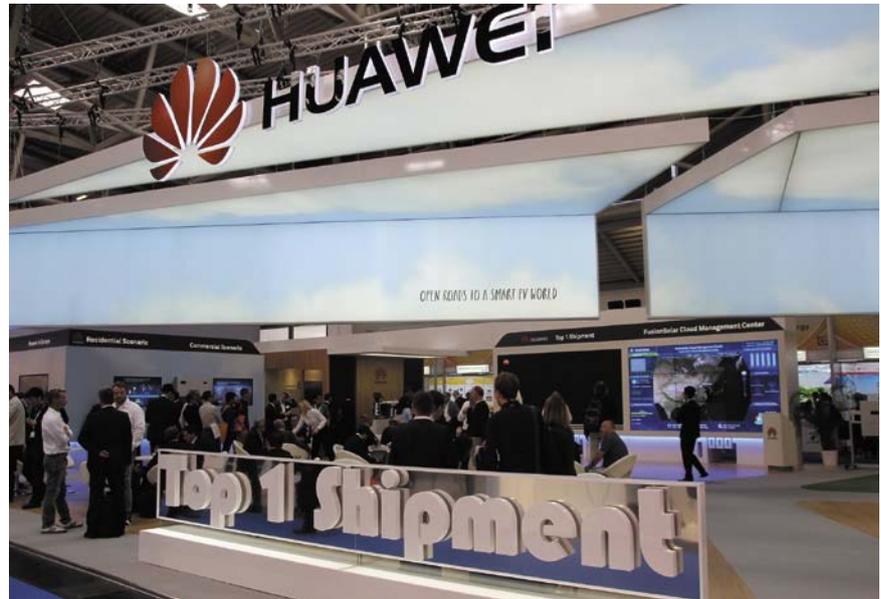


► Huawei stand at Intersolar Europe 2016: The Chinese manufacturer is the global market leader, ahead of SMA, when it comes to total inverter capacity supplied



Jochen Steiner / PHOTON Pictures

# Caught out

EMC problems affected Sungrow and Huawei inverters – and how SMA is trying to use this to its own advantage

Text: Anne Kreutzmann

## Highlights

- The inverter manufacturer SMA has performed tests on inverters made by its competitors, and established that there are Huawei and Sungrow devices that exceed the threshold for electromagnetic interference.
- Although both manufacturers have already stopped sales of the two devices concerned – this more than a year ago in the case of Sungrow – and there are no devices currently affected, SMA sent out letters to installers in April with a number of warnings formulated in drastic terms.
- SMA is also aggressive about exposing technical problems affecting its competitors – without actually specifying names – on a website especially for this purpose.

In its letter dated April 11, the inverter manufacturer SMA Solar Technology AG informed installers in Germany about »dangers emanating from certain inverters made by the Sungrow and Huawei brands«. In the letter, which PHOTON has a copy of, the authors continues: »We tested the SG 50 KTL-M and Sun2000-33KTL/40KTL inverters made by the aforementioned manufacturers in our laboratory. Our test results are meanwhile also verified by an independent laboratory. Our measurements revealed that, among other things, the EU thresholds for electromagnetic compatibility (EMC) have been violated, sometimes exceeding them by 16 times the limit. This means that the devices in question made by the manufacturers Sungrow and Huawei are emitting interference that can have a considerable impact on certain safety-relevant systems, as are, for example, also used in rail and air traffic.« The Federal Network Agency has also been informed of the test results, and it will »conduct the corresponding inquiries into the manufacturers named as part of its duties«.

Finally, the authors of the letter, the spokesman for the board, Pierre Pascal Urbon and Marko Werner, head of sales for Europe and the Middle East and Africa (EMEA), also point out the potential for consequences under criminal law for resellers and solar installers: »The sale of the aforementioned inverters, which do not

comply with EU thresholds for EMC, is prohibited, and the supply of these inverters to your customers may result in the customer initiating claims against you as a reseller and supplier. Depending on the situation, the use of these non-approved inverters in Germany can, in the worst case, also result in consequences under criminal law and personal liability for the persons involved.«

## All clear in the case of Sungrow

Having been confronted with the allegations, Sungrow presented us with a certificate for the type of device concerned confirming its conformity with the EMC standard. It was issued to Sungrow Power Supply Co. Ltd. on January 28, 2015 by a TÜV Group test laboratory, and encompasses compliance with the standards EN 61000-6-1:2007, EN 61000-6-2:2005, EN 61000-6-3:2007+A1, and EN 61000-6-4:2007+A1.

The test report, of which PHOTON also has a copy, includes diagrams of measurements in the frequency range spanning 30 megahertz (MHz) to 1 gigahertz (GHz), as this is the range relevant for the standard. The values are all at a safe distance below the threshold, with the curve only veering quite close to the limit in the long-wave range and only exceeding it marginally in isolated cases – and this is still within the measuring tolerance, meaning the standard has been

complied with. This allows Sungrow to apply the CE marking, which is used by manufacturers in Europe to verify the technical safety of electronic equipment, which in turn indemnifies customers and operators in terms of the applicable product-specific European guidelines. Everything up to this point is therefore in the clear.

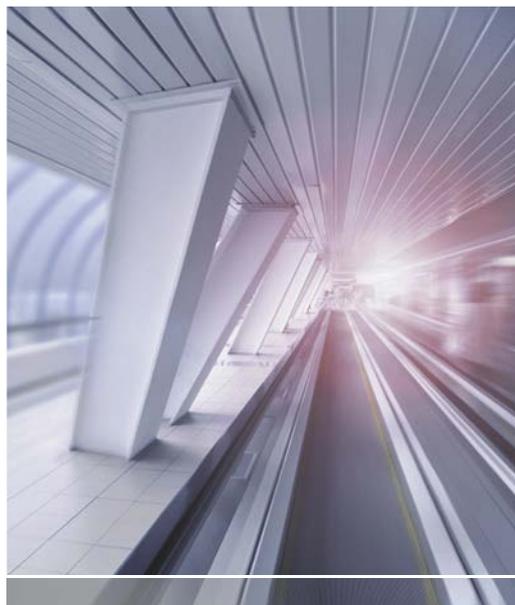
The German Federal Network Agency, which along with market regulation, is also responsible for technical safety in the German power grid, confirmed to PHOTON that »a complaint was recently made against two types of devices produced by the manufacturers you named: Sun2000-33KTL (Huawei) and SG50KTL-M (Sungrow)«. The agency then requested each manufacturer to send five specimens of the respective devices, and conducted measurements of its own. According to the information available to PHOTON, the outcome is that »the Federal Network Agency was able to use its measurements to prove in both cases that the products do not comply with thresholds used as a basis for the harmonized standards. The manufacturers have been confronted with the results of the measurements in both cases.« This, however, occurred in the case of Sungrow more than one year ago, on February 23 2016.

### No recall planned

The test report issued by the Federal Network Agency for the Sungrow device (PHOTON also has a copy) does indeed include diagrams showing measurements that are very similar to those in the TÜV report. In both cases, the diagrams cannot be shown without the full report, which is why a brief description has been instead been used for the results from the Federal Network Agency (the actual test reports themselves are far too long to be reprinted).

The five Sungrow inverters were measured in the Kolberg test laboratory that belongs to the Federal Network Agency, and which is located in Heidensee near Berlin. The test laboratory is, just like the TÜV, an institute accredited to perform measurements of this type. Tests were done to determine the interference voltage on the network cable and the strength of the interference field within a 30 MHz to 1 GHz range. Conformity with the standard was confirmed for the cable-related interference voltage, while all five devices failed to adhere to the thresholds listed in the standard for non-cable-related interference voltage. The thresholds were exceeded in the long-wave range, just above 30 MHz, and totaled 10.12 dB (at a measuring accuracy of 5.2 dB). The problem that the TÜV measurements had already indicated does, in fact, result in the specified upper limit being exceeded in this case.

Sungrow then, as it has stated, informed its customers of the situation with immediate effect and withdrew the device from circulation. The remaining inventory was sent back to China, as Stefan Froböse, Technical Director EMEA, confirms. The measurements made



### ADVANCED CONTACT TECHNOLOGY

# A connection for the future

### Multi-Contact becomes Stäubli Electrical Connectors

The leading international manufacturer of electrical contacts and system solutions for industrial applications has been part of the Stäubli Group since 2002 and is now taking on the latter's name and brand identity

- Innovative and specialised product portfolio from miniature up to high-power connectors
- Highest quality for safety and reliability
- Individual and tailor-made customer solutions

As of January 1, 2017, Multi-Contact continued its business and services as Stäubli Electrical Connectors.



**Reliability in every connection.**  
**Versatility for every application.**

[www.staubli.com/electrical](http://www.staubli.com/electrical)



Stäubli is a trademark of Stäubli International AG, registered in Switzerland and other countries.  
© Stäubli 2016 | Photocredits: Dmitry Yashkin/Shutterstock, Stäubli

# »Comparable to a dead spot«

Questions for Olaf Peter Eul, press officer for the Federal Network Agency

**Can you provide specific details of the magnitude of the violation of the thresholds? SMA writes that the thresholds were exceeded by up to 16 times the limit.**

It ultimately doesn't matter by exactly how much the thresholds were exceeded. What is important in this context is, in fact, the potential effects, the ones which the Federal Network Agency analyzed in its risk analysis. In this case, and in just about every other case that has been examined, there are absolutely no dangers to life and limb of people or animals.

**Your risk analysis arrived at the conclusion that there is a »medium-level risk«. What is the worst thing that could happen?**

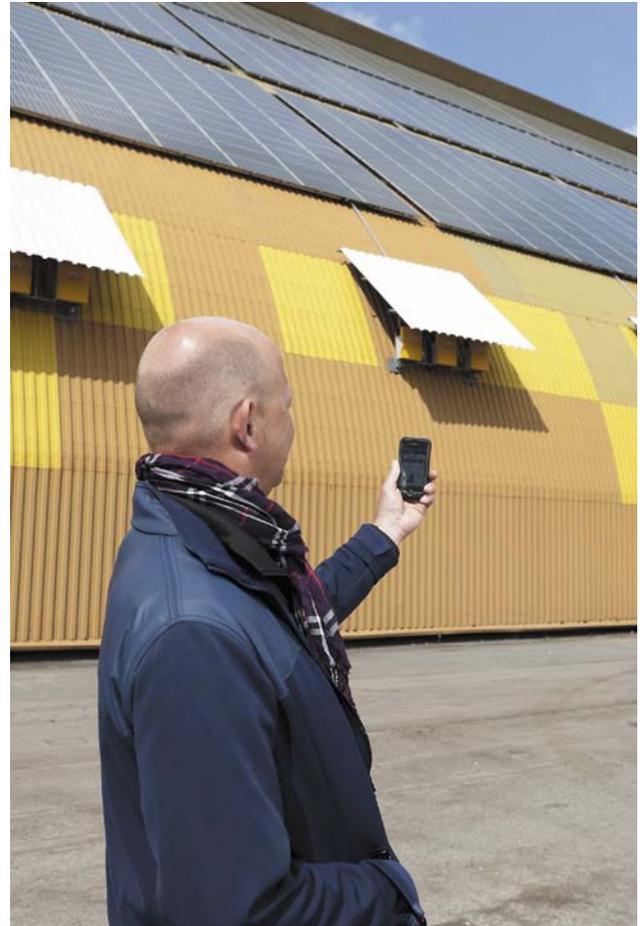
A number of radio-operated functions may fail in the immediate vicinity of the device. This is comparable with a dead spot. The following formula is used: Risk equals damage multiplied by likelihood of occurrence. Damage would, in this case, refer to disruption of broadcasting signals, and the likelihood of occurrence is assessed as higher in this case as the units are stationary and constantly causing interference. This is nothing more than a matter of potential interference of radio services – and that can usually be avoided by moving away from the source of interference.

**This means that a recall is unnecessary?**

Yes, that's right. The measures imposed by the Federal Network Agency must be reasonable, and the reasons mentioned do not warrant a recall.

**Thank you for the interview.**

**Interview** Anne Kreutzmann



Carsten Bahler / PHOTON Pictures

▲ If the inverter does not comply with the EMC standard, cell phone reception may, for example, be disrupted

by the Federal Network Agency are considered »plausible« at Sungrow. This is why it has overhauled the device and offered its customers a replacement: »A few hundred devices were sold, and their replacement is being coordinated with the Federal Network Agency,« as Froböse explains. The Federal Network Agency confirmed this when asked: »Both manufacturers have assured us that sale will stop immediately. The devices will only now be sold in a modified form.« And: »As both manufacturers have signaled that they will stop sale immediately, there is no need for the Federal Network Agency to take any further action. A recall is not required in cases like this.«

## Replacement is a matter of discretion

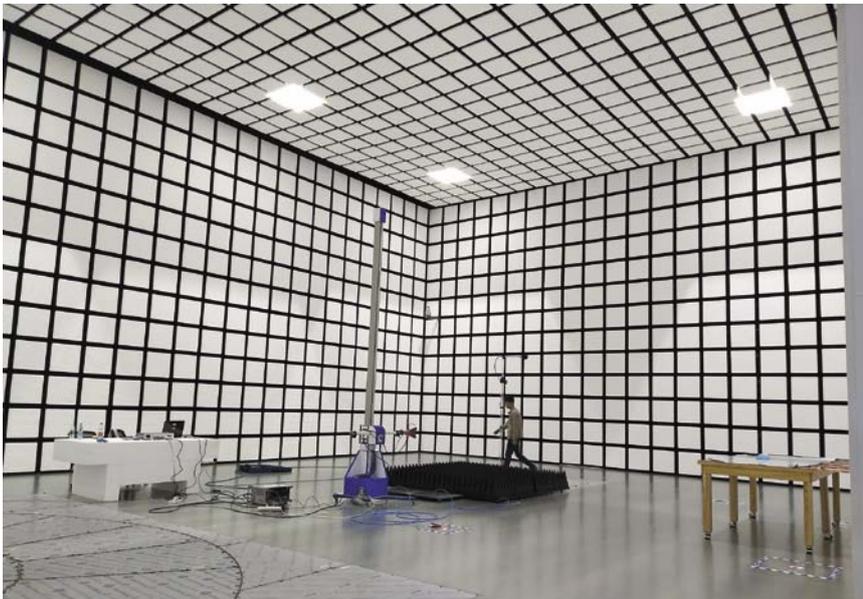
Should those affected perform the replacement offered by Sungrow just to be on the safe

side? To answer this, we informed Jörg Kirchhof, head of the EMC laboratory at the Fraunhofer Institute for Wind Energy and Energy System Technology (IWES) in Kassel, about the test results for the Sungrow devices and asked for his opinion: »The devices should be replaced in all cases in which they have been installed in residential areas,« as Kirchhof explained, »if the array is, in contrast, installed on a field far away from residential buildings and technical equipment, then it is unlikely to disturb anyone.« In the end, it is also a matter of discretion in the second case, this being installation in an isolated location: interference might affect amateur radio operators, for example, in the frequency range concerned.

That little disruption of other technical equipment need be feared in open land is largely due to the physics at the core of the phenomenon. The interference decreases by the power of three

in the near range, and by a factor of  $1/r$  in the far field, this being proportional to the square of the distance to the respective source. In short: It can't be measured even at a distance of just a few meters. The potential for disturbance, of course, still exists in residential areas. However, the inverter about which the complaint was made has an output of 50 kilowatts, and is therefore not a device typically used for roof-mounted systems, and will rarely be encountered there. As far as he knows, as Sungrow director Froböse says, this type has only ever been used in greenfield arrays, and he is not aware of any disturbances.

This doesn't, however, make the whole affair any less unpleasant for Sungrow. In order to ensure absolute compliance with EMC thresholds in future, it has now set up an EMC laboratory of its own at its production facility in China. It is accredited and can measure devices with an output of up to three megawatts. From now on,



Sungrow Power Supply Co., Ltd.

◀ Sungrow's new EMC laboratory in China: Even after receiving an EMC certification, spot checks will be carried out on devices in future.

random samples are to be taken from ongoing production at regular intervals.

### All clear at Huawei as well

Just before our editorial deadline, Huawei made a statement to PHOTON after all. The company confirmed that in early 2017, the Federal Network Agency established that devices of type Sun2000-33KTL were exceeding the threshold, however did not state the frequency range or the level at which this occurred. Huawei assured us that the device presents no danger for humans or animals – which is also something the Federal Network Agency underscores (see box) – and has also had this confirmed by TÜV Rhineland. In a test report issued in May 2017, TÜV confirms that the product is compliant with the standard DIN EN 62311, which ad-

dresses the effects of electromagnetic radiation on persons. No damage to the device itself need be expected either, something that has also been confirmed by TÜV.

In contrast to Sungrow, Huawei leaves the question of whether external EMC measurements were conducted before the device received the CE mark and was sold unanswered. This is, ultimately, the company's own business. As long as it can rely on the measurements from its own laboratory, it can also use these measurements as a basis to confirm its compliance with the standard. However, should problems occur, as is now the case, it becomes the one responsible. Just like Sungrow, Huawei also stopped the sale of the device concerned and has released an overhauled version, the Sun2000-33KTL-A, for which the company can present an EMC certificate issued by the Bureau Veritas Shenzhen

Co. Ltd., dated May 2, 2017. Huawei does not consider it necessary to replace the device as a precaution. Alison Finch, chief marketing officer at Huawei Solar Europe, assured PHOTON that the company »deeply regrets this failure«, has »fully investigated the reasons,« and has been able to establish »that all products on sale are now conform to standard«.

Meanwhile, SMA is continuing to issue a warning on its English-language website »solar-trust.com« about »just plain illegal« interference emitted by a number of inverters made by its competitors. ●

#### Further information

Contacts page 79

## hönle group



### Sun Simulation and UV Irradiation Systems

We offer sun simulation systems (CCC-BBA) for tests as **Light Soaking** or **Hotspot** and UV irradiation systems for **UV preconditioning tests**.

All our products comply with the international standards **EC 61215 / IEC 61646**.

**Make sure your PV modules meet your requirements.**



[www.hoenle.com](http://www.hoenle.com)