REMCOM®

Overview

- **Organization**: KEC Limited. Founded in 1979, headquartered in Aldermaston, Berkshire, UK.

- **Challenge**: Strengthen market leadership and differentiate from the competition by offering a unique technology.

- **Solution**: Test cable harness system models using EM simulation in order to improve the likelihood of passing EMC certification the first time.

- **Result**: Pinpointing issues during the design process eliminates costly redesign. This service adds value for KEC's customers.

- **Product used**: Remcom's XFdtd®

Customer

KEC, Ltd.:

David Dyson, Chairman

Cheryl Watson, Managing Director

Simon Ireland, Design and Development Engineer

KEC designs and manufactures EMC backshells for standard circular, rectangular and "D" type connectors, as well as a range of bulkhead glands and fittings, conduit systems and cable harnesses. KEC has built its market leadership by providing excellent electrical shielding between a harness system's connectors and the cable through the use of shielded backshells and continuity between connectors and panels. But over time they began to realize that customers were buying their components and giving them to others to build complete harness systems. They responded by expanding their offerings to include the entire EMC interconnect cable harness design and build process.

As they have grown the business, differentiating themselves from the competition has become an important goal. To accomplish this, KEC is developing further expertise in the area of electromagnetic simulation of the harness systems. By modeling and simulating customers' designs, KEC can identify problems early in the process and recommend corrections before the EMC certification stage. This enables customers to avoid costly mistakes and pass certification testing on the first try.

The Challenge

When researching potential unmet needs in their target markets, KEC's team focused on the challenges their customers faced during EMC testing and certification. In addition to the demanding requirements of the defense and aerospace markets, international legislation has created rigorous specifications that challenge many other industries such as telecommunications, railroad, and computing.

the emc interconnect experts

Because it's very expensive if a device fails and has to be redesigned and retested, manufacturers need confidence that the harness system is in compliance before integrating it into their designs and installing it into their equipment. KEC recognized that providing simulated results early in the design stage could greatly assist their customers. It also happened to be a unique technology that was not being offered by anyone else.

David Dyson, chairman at KEC, said, "We realized that we could provide a more complete solution for customers by testing the harness system first using EM simulation. The simulations demonstrate how the shielding protects the wiring and signals from RF fields, allowing us to pinpoint weaknesses if they exist. We can then help the customer to redesign until the simulation results are satisfactory. The goal is to pass the certification the first time."

In order to implement their strategy, KEC's next step was to shop for an EM simulation tool that they could use on their own to model and simulate the harness systems.

How Remcom Helped

KEC approached various providers of EM simulation software and decided on XFdtd (XF7), Remcom's full wave 3D EM solver.

Simon Ireland, design and development engineer at KEC, said, "We chose XFdtd because the product is so easy to use. The XF7 interface is intuitive, making it simple to set up complex problems. Remcom's solution was head and shoulders above the others we evaluated."

Several different applications were tested, based on some key customers' specific projects. One project included both commercial and academic problems. From the academic side, a series of dipole antennas and other textbook type simulations were examined in order to compare the simulation outputs with theoretical solutions. From the practical/commercial side, a series of test harnesses were manufactured and put through EMC testing. Simulations of these test harnesses were then performed to compare the simulation outputs with real world problems.
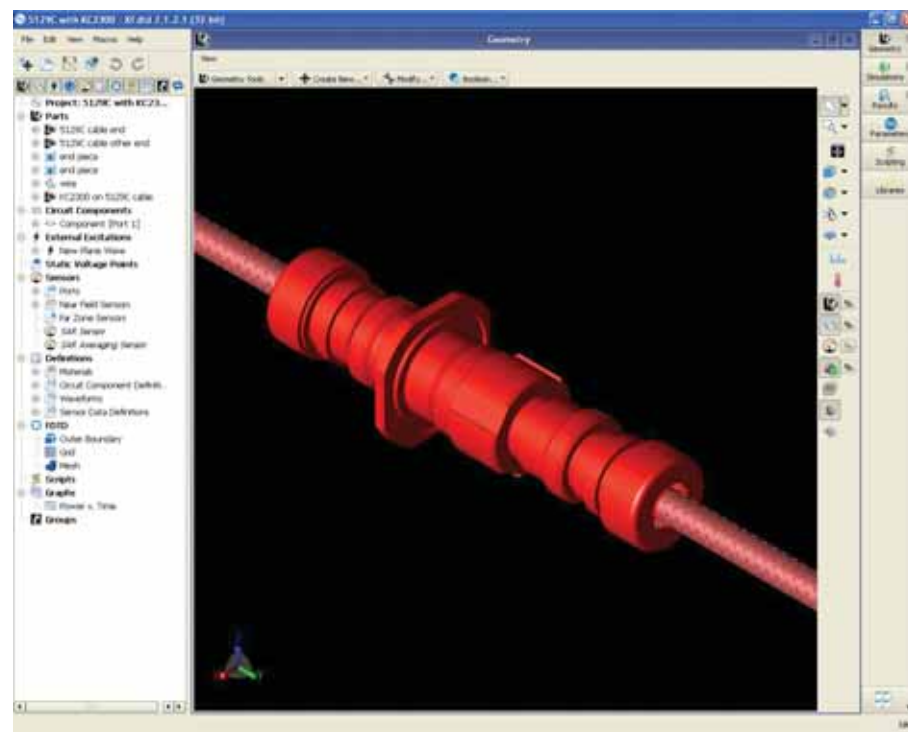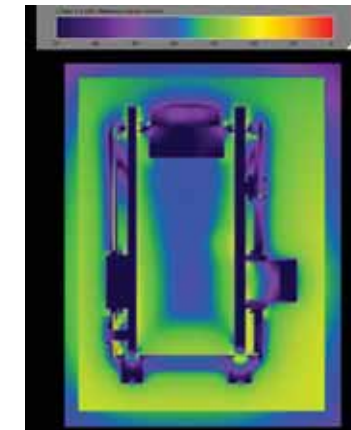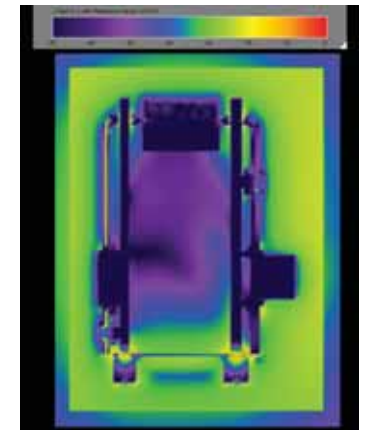

Geometry for cable harness test

Another scenario examined the design of a folded metal backshell as an alternative to castings for low production runs. KEC had to design the metal folds in such a way that would allow the backshell to fit together, and there were several ways in which this could be achieved. By simulating the different options in XF7, a measureable difference was seen, enabling the team to choose the best design option.
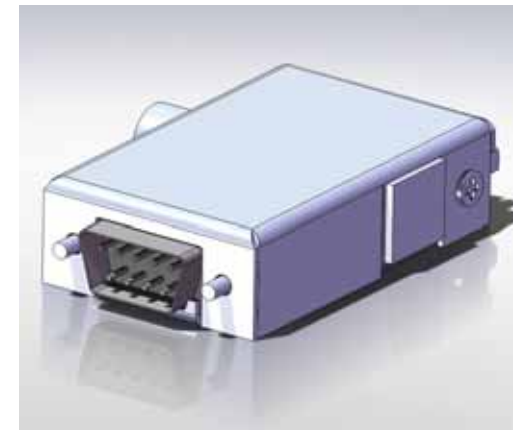
Design of folded metal backshell   *Analysis of first configuration*   *Analysis of second configuration*

"Remcom impressed with their software, specifically the ease of use, but also with the support received during the product trial," Ireland said. "Remcom engineers provided very detailed responses to any questions I had, and I usually received a reply within a day of sending my e-mail."

Results and Summary

A few select customers are currently working with KEC to use their problems as a testing ground for the new service. The team is refining the simulation process for these customers' specific applications and comparing the simulated results with the actual equipment being tested. Response is proving extremely positive, and KEC will soon be offering the service as part of their regular product line.

"There are many benefits to including EM simulation in the typical cable harness design process that reach beyond the added value to our customers," Dyson said. "In the EMC interconnect arena, the usefulness of EM simulation is just being discovered. It is our hope that by demonstrating the value of in-situ testing before proceeding to EMC trials, we will be at the forefront of wider industry adoption."

Electromagnetic Application Example Library

Remcom's website features a wealth of application examples that can be sorted by project type or product. This library contains nearly 100 demonstrations of how Remcom engineers solved problems in various categories such as Antenna Design and Placement, Biomedical, Wireless Propagation, Radar and Scattering, and more.
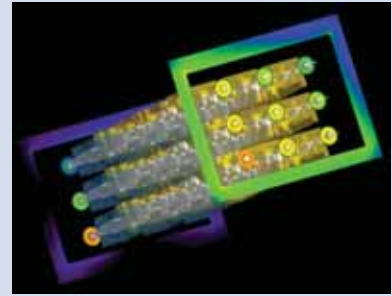
Explore these Application Types and related resources to help simplify your work and products. Visit **www.remcom.com/electromagnetic-applications**.

Remcom has been leading the EM market with innovative simulation and wireless propagation tools for 15 years. In addition to our flagship product, XFdtd, we offer a suite of innovative software and services, accessible and responsive support provided by a staff of experts, and comprehensive training. Our family of products includes:

XF **XFdtd**®: 3D EM simulation software package that provides engineers with powerful and innovative tools for modeling and EM field simulation.

XS **XStream**®: GPU acceleration using NVIDIA's CUDA architecture dramatically speeds numerical computations.

XG **XGtd**®: A high frequency GTD/UTD based package for the design and analysis of antenna systems on complex objects such as vehicles and aircraft.

WI **Wireless InSite**®: A radio propagation analysis package for analyzing the impact of the physical environment on the performance of wireless communication systems.

VP **VariPose**®: A geometric modeling package for the manipulation and refining of high-resolution human mesh models for the medical and biomedical markets.

RL **Rotman Lens Designer**®: A software tool for the design, synthesis, and analysis of Rotman Lenses.

Please contact Remcom to learn more about our EM Simulation Solutions:
sales@remcom.com | 814.861.1299 | **www.remcom.com**

Remcom, Inc.
315 S. Allen St., Suite 416
State College, PA 16801 USA

+1.888.7.REMCOM (US/CAN)
+1.814.861.1299 phone
+1.814.861.1308 fax

sales@remcom.com