

# Measuring our SuperKords™

Russ Andrews®

We promised in a previous issue of *Connected* to publish comparative graphs for the performance of our SuperKord-SD II mains cables when pitted against a standard mains cable and our PowerKords. We've published Ben Duncan's measurements of our different PowerKords before in *Connected* and we thought it would be a good idea to publish these more recent measurements since they objectively show some of the differences between the PowerKord and SuperKord-SD II range of mains cables, and also between our mains cables and a standard, non-woven IEC mains lead (such as might be supplied with a CD player or amplifier, for example).

## What we did

We employed an accredited test house, 3C Test Ltd, which is an independent UKAS Accredited EMC test facility. Based near Silverstone, 3C carry out a range of tests to show the Electromagnetic Compatibility of a product – anything from motor cars to medical equipment or computers. We employed 3C to test the ability of our cables to reject conducted electromagnetic interference, and their tests were carried out to industry standards.

## What we tested

The research and development work we undertook to produce our SuperKord range of mains cables included objective measurement of the cables in addition to our extensive listening tests. Under measurement, we wanted to see how the new SuperKord mains cables compared against a standard mains cable and one of our woven PowerKords. The cables that we tested were a standard, non-woven 3-core mains cable, a Signature PowerKord and the SuperKord Signature-SD II. 3C tested the ability of all three cable types to filter conducted Electromagnetic Interference in both Differential Mode (RF noise which appears between phase and neutral wires of a mains cable), and in Common Mode (RF noise which is identical on both live and neutral wires with respect to ground).

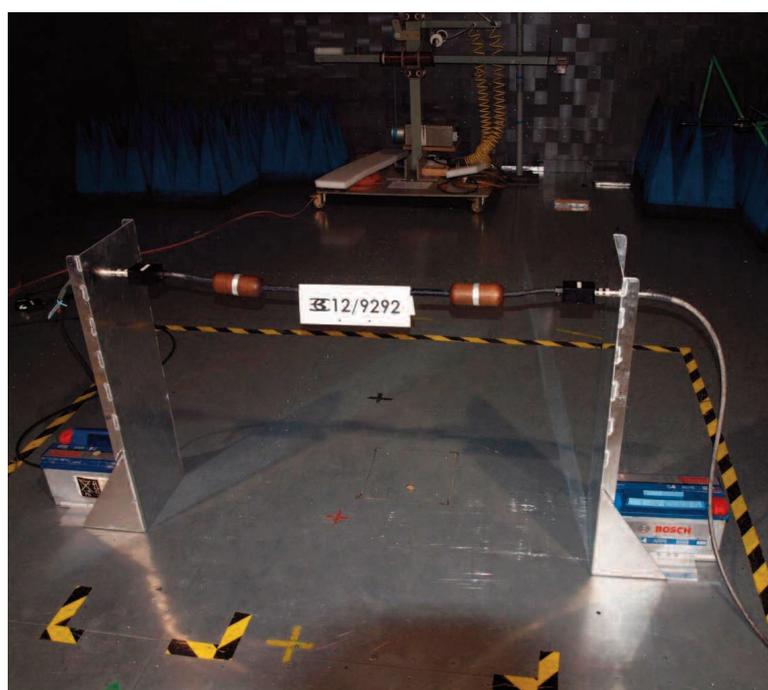
We were keen to test the effect of the cables on

Common mode noise as CM is thought by the EMC community to be a particular problem to audio equipment since it isn't as easily absorbed by the transformer, and proportionally more of the Common Mode noise gets into the audio processing circuits.<sup>1</sup> Nonetheless, we believe that Differential mode noise is a greater cause of degradation of sound quality to audio equipment.

The test methods that 3C undertook were to industry-standard test EN55016-1-2 and EN55016-2-1. And 3C in fact measured from 9kHz to 1GHz in CM and DM, so over a far wider range than the tests specify.

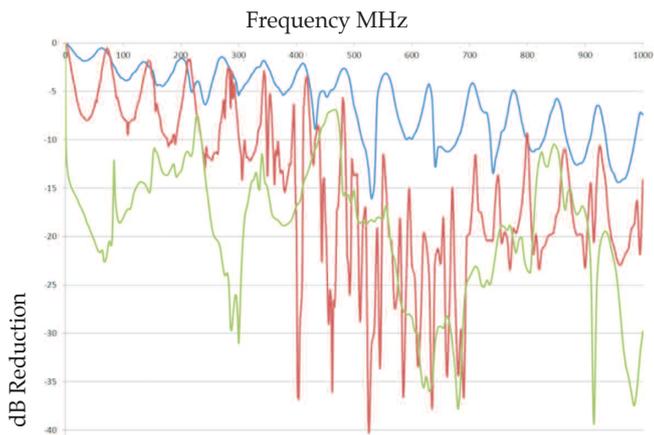
## So what do the plots show us?

The plots show how the cables differently reject conducted interference between 0 and 1000MHz (1 GHz) in both Differential Mode and Common mode. It's clear that, under test, both the Signature PowerKord and the SuperKord Signature-SD II are able to filter Differential Mode and Common Mode noise to a greater degree than the standard 3-core IEC mains lead.

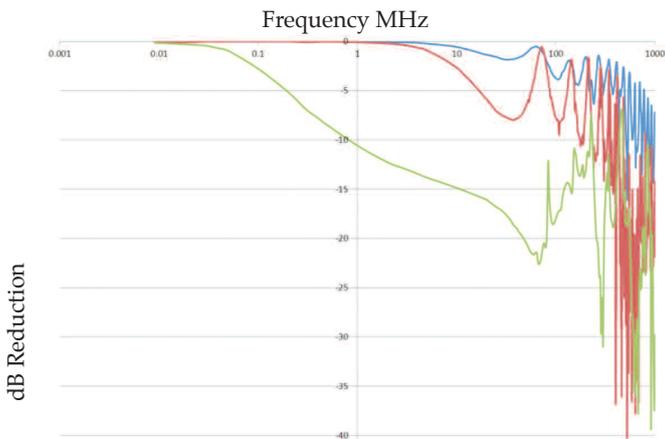


A Signature SuperKord-SD II™ being tested

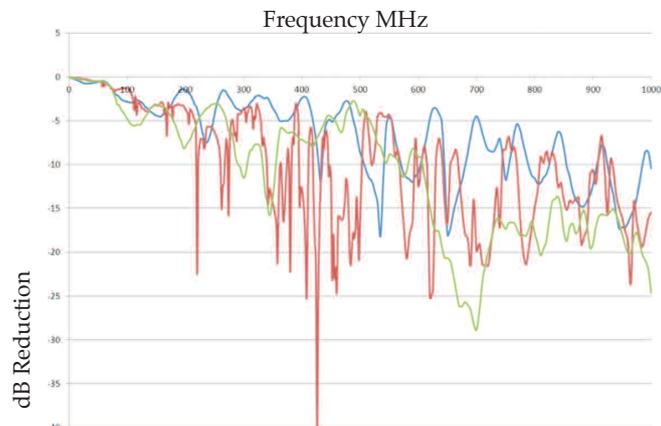
# The Results



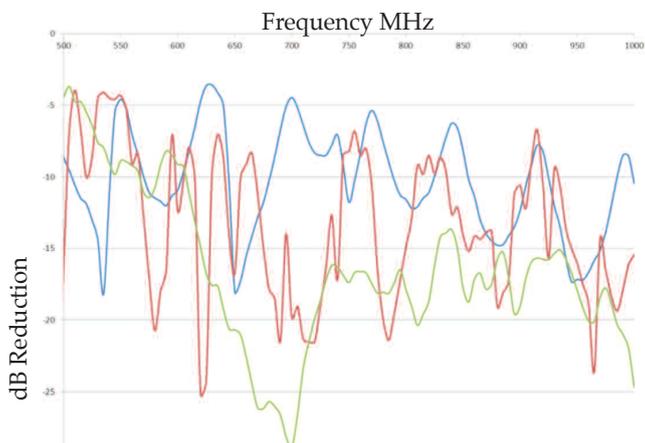
Plot 1: Differential mode, conducted. Linear frequency scale



Plot 2: Differential mode, conducted Log frequency scale (MHz)



Plot 3: Common mode, conducted. Linear frequency scale



Plot 4: Common mode conducted. Zoomed into the 500MHz to 1GHz range, where the largest difference between the three cables is.

Note that the Superkord has a deep minimum at 700MHz, 25dB below the kettle lead 700MHz is the digital mobile phone frequency.

— Non-woven mains lead  
— PowerKord™  
— SuperKord™

Craig Sawyers, co-designer of the SuperKord Signature-SD II commented “an aim of mine when designing the SuperKord-SD II range of mains cables was to ‘smooth-out’ the noise rejection characteristics of the PowerKords. The PowerKords have a ‘comb-like’ noise rejection; my aim with the SuperKords was to make this rejection flatter and smoother. The graphs show this to be the case.”

## What don't the plots show us

The plots show how the cables perform under test in laboratory conditions. Whilst we could infer that the same level of rejection occurs in a domestic environment (ie. when the cables are plugged into a Hi-Fi or Home Cinema system) we are not claiming that they do. Similarly, the graphs do not prove that the rejection measured in the lab has a perceptible (ie audible) effect when the cables are used in a Hi-Fi or Home Cinema System.

We believe, however, that our mains cables have a positive effect on the sound quality when used on audio equipment – and the very best way for you to find out for yourself is to take advantage of our 60-day Home Trial and audition standard length cables in your own system at home. If, at the end of the trial period you are not satisfied, return them for a full refund. The proof of the pudding is in the listening!

## Why we've published the graphs

We're showing you these graphs not to blind you with science but to show you the extent of the measurements we've organised in the development of the SuperKord mains cables. Although we normally just talk about how things sound, it's important to know that we've made the measurements too.

The second reason for showing them is that we believe that they are impressive: a 25dB reduction is over ten times quieter! The EMC experts at 3C expressed great scepticism that there would be any measurable difference between our woven cables and standard non-woven IEC lead when we initially approached them to have the cables tested. Their own results rather surprised them!

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1: Armstrong, E K: *Report on Russ Andrews Accessories Ltd "PowerKords"*, 2010

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